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THE EMERGENCE OF CHINA'S FAR WEST
—
BRITISH INTERESTS IN CHINA
—
THE CONQUEST OF THE TROPICS

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No. 8

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FAR EASTERN CROSS-CURRENTS

U.S. Abrogates Pact with Japan

"During past years, the Government of the United States has been examining treaties of commerce and navigation in force between the United States and foreign countries with a view to determining what changes may need to be made toward better serving the purposes for which the treaties were concluded.

"In the course of the survey, the United States had come to the conclusion that the Treaty of Commerce and Navigation between Japan and the United States, signed in Washington on February 21, 1911, contains provisions which need new consideration.

"Toward preparing the way for such consideration and with a view to better safeguarding and promoting American interests as new development may require, the Government of the United States, acting in accordance with the procedure prescribed in Article XVII of the Treaty under reference, gives notice hereby of its desire that this Treaty be terminated and, having given notice, will expect the Treaty, together with its accompanying protocol, to expire six months from this date."

This note was presented to the Japanese Ambassador in Washington, Mr. Kensuke Horinouchi, on July 26 by the then Assistant Secretary of State, Mr. Francis B. Sayre, son-in-law of the late President Wilson and newly appointed United States High Commissioner for the Philippines. Diplomatic experts in Washington believed that the note was intended as a retort to Japan because of damage being inflicted upon American property in China as a result of large-scale hostilities.

The State Department announced its decision to denounce the treaty only a few hours after the Senate Foreign Relations Committee had decided to postpone action on Senator Arthur Vandenberg's resolution which would have placed the Senate on record as favoring the action. The postponement of a committee vote was attributed to the view held among its members that the Anglo-Japanese agreement reached in Tokyo had brought about a drastic change in the balance of power in the Orient, necessitating an examination of the United States' rôle in Far Eastern diplomacy.

The President is understood to have approved of the abrogation which does not become effective until January 26, 1940. Congress will then be in session, and will be able to discuss the question of placing an embargo on the export of raw materials to Japan. Supporters of the embargo believe that its application will have such an effect upon Japan as to check her in China and may enforce her withdrawal. Opponents of the embargo regard it as a step toward war, believing that Japan would retaliate, after which there will be retaliation by the United States, and thus may lead to a conflict.

The Japanese were apparently taken by surprise. The first comment of the Japanese press indicated that political and not economic motives were behind the decision of the State Department, basing the argument on the fact that the trade between Japan and the United States was decidedly in favor of the latter.

Mr. Hachiro Arita, Foreign Minister, informed the Cabinet of the abrogation on the morning of July 28. Mr. Seiji Yoshizawa, Director of the Bureau of American Affairs of the Foreign Office, made a comprehensive statement on the abrogation over radio on the night of August 7, and linked it with President Roosevelt's statement to Congress made last January that pressure should be applied to Japan, Germany and Italy by measures "short of war but stronger and more effective than mere words." Envisaging a treatyless situation that may arise after January 26, next, Mr. Yoshizawa stated:

"What is certain (unless a new treaty is concluded) is suspension of the most-favored-nation clause, which, admittedly, will have

serious effects on some lines of business. Also, when Article V of the existing treaty is no longer operative, the American Government will be in a position to put an embargo export of any commodity to Japan.

"Now that the treaty will definitely come to an end six months hence, we are studying the situation against the worst possibilities. But it may as well be said that the situation regarding the China affair, which may be the root cause of the American treaty abrogation, has to be observed from different angles, as different developments seem possible.

"The Chiang Kai-shek regime itself may manage to hold its ground through the next six months, but the political structure in the area under Japanese occupation may meantime be so adjusted and strengthened, and the construction of a new order may so progress, that America may no longer have reason to refuse her collaboration in our undertaking."

Chungking was jubilant over the abrogation. The morale of the Chinese, which seemed so low when the Anglo-Japanese agreement was announced, was bolstered up again. According to a Reuter's message from Chungking on July 28, the news of the abrogation was the subject of discussion throughout the city, and was "welcomed with feelings of joy and enthusiasm only equalled by the news of the Taierchwang victory." It is generally believed, the message said in part, that the abrogation will considerably strengthen Great Britain's position at the Tokyo conference, "thereby raising the hope in China that Britain may hereafter take a much stronger stand in dealing with Japan."



Anglo-Japanese Agreement Reached

As the result of the conversations held between Sir Robert Craigie, British Ambassador in Tokyo, and Mr. Hachiro Arita, Japanese Foreign Minister, on the Anglo-Japanese issue at Tientsin, an agreement was reached, and announced in London and Tokyo on July 24. It read:

"H.M. Government in the United Kingdom fully recognize the actual situation in China where hostilities on a large scale are in progress and note that as long as that state of affairs continues to exist, the Japanese forces in China have special requirements for the purpose of safeguarding their own security and maintaining public order in regions under their control and that they have to suppress or remove any such acts or causes as will obstruct them or benefit their enemy.

"H.M. Government have no intention of countenancing any act prejudicial to the attainment of the above-mentioned objects by the Japanese forces, and they will take this opportunity to confirm their policy in this respect by making it plain to the British authorities and British nationals in China that they should refrain from such acts and measures."

Since then the pending questions have been referred to a round-table conference of the representatives of the local authorities of the two countries.

The press comment on the agreement showed a lively reaction. *The Manchester Guardian* urged the continued support of the Chinese dollar, the *News Chronicle* asked for a new substantial credit to Chungking, while the *Daily Mail* lauded Sir Robert Craigie, saying, "He has successfully surmounted the first hurdle of the Anglo-Japanese negotiations." *The Times* said: "Nothing has been given away in the formula. It does no more than codify the state of affairs that already exists, and offers a basis, if used with

restraint, for a *modus vivendi* in the future. Certainly it does not mean that Britain is committed in advance to agree to every demand that any Japanese commander in China may care to make."

The British Chamber of Commerce and China Association in Shanghai sent a telegram to London on July 25, categorically protesting against the agreement as indicating that "Britain is abandoning her duty, obligations and legal position in China," and "this is likely to result in the deplorable betrayal of British rights and interests and obligations in China."

The Chungking Government was furious over the agreement. Dr. Quo Tai-chi, Chinese Ambassador in London, called on Lord Halifax, British Foreign Secretary, on the afternoon of July 24 to seek information on the agreement, and made a protest against a possible concession in North China prejudicial to the Chinese cause.

The younger extremists at Chungking were showing signs of impatience, according to a Reuter's report of July 25. One typical comment of this group was, the report said, "If Japan can wage an anti-British campaign, why cannot China?" They intimated, the report added, that, if the worst comes to the worst, "the Chinese can embark on a wholesale withdrawal from the foreign concessions, at the same time launching counter-measures which will make the owners sit up and reconsider their attitude."

General Chiang Kai-shek could not remain silent. At the Weekly Memorial Meeting held at Chungking on July 25, he emphasized that any understanding affecting China arrived at between Great Britain and Japan without the cognizance and approval of the Chinese Government could have no validity whatever and could, in fact, never be put into effect.



Russo-Japanese Oil Dispute

Official information has reached Tokyo that an agreement was reached between the representatives of the North Sakhalin Petroleum Company, a Japanese concern, and delegates from several Soviet trade unions, on the general principles of a new labor contract destined to replace the one which expired on December 5, 1938, according to an announcement made by the Japanese Foreign Office on August 7.

The new contract, it is understood, calls for a 15 per cent increase in wages for Soviet workers, but there are still some details to be worked out. A final contract is not expected to be signed before the end of August.

The Japanese have agreed that the conditions under the new contract be applied from last December to the end of November this year. This means that the Soviet workers will be paid their salary increase during the time they struck. They will return to work late in August only.

Owing to the fact that the season for the exploitation of the oil fields in Sakhalin ends in September or October due to the intense cold, the present settlement of the conflict seems somewhat precarious since the new contract will be valid only until next November.

It may be recalled that Japan lodged a strong protest at the Kremlin on July 15 against the 374,000-rouble fine imposed on the Japanese petroleum firm. The fine was confirmed by the Alexandrovsk Appeal Court, which found that the Japanese firm had violated the labor contract. The Japanese Government also made representations against Moscow's announced intentions to confiscate the holdings of the Japanese firm if the fine is not paid on July 19.

The Japanese rights in North Sakhalin were recognized by a contract of concession appended to the treaty of amity, concluded in 1925 between Moscow and Tokyo whereby Japan recognized the Soviet Government. The above-mentioned Japanese concern, established after the conclusion of the treaty, was allowed in accordance with the contract of concession to prospect and produce in developed and undeveloped oil fields on the eastern coast of North Sakhalin and to conduct business incidental to these enterprises.

Division of the fields was provided under the "checkerboard system," with the Japanese and the Russians developing alternate but not contiguous blocks. The Japanese firm undertook to pay a fixed rate of compensation for the oil produced, to pay taxes, to employ a fixed ratio of Russian workers and to obey Soviet labor laws.

Moscow does not like to supply oil and coal to the Japanese Navy and resorts to all possible measures to bring pressure to bear upon Japanese oil and coal concessions in North Sakhalin, as well as

on Japanese fishing interests in northern waters. The local Soviet authorities are alleged to have made frequent approaches to members of the staff of Japanese oil and coal companies to engage in espionage in favor of the Soviet Union. A Japanese clerk, who refused such an offer, was forced some time later by a Soviet militiaman and a member of a local Labor Union to sign a deposition that he had attempted to attack a woman, and was sentenced to five years' penal servitude on July 26. The case became a diplomatic issue on August 13 when the Japanese Embassy in Moscow lodged a vigorous protest with the Soviet Government.



Parley Deadlocked

It was reported from Tokyo on August 6, and from London almost to the same effect on August 7, that preparations for drafting a written agreement to be exchanged between the Government of Japan and Great Britain concerning policing and peace maintenance in the British Concession in Tientsin were completed at an informal meeting of the representatives on the afternoon of August 4. The agreement would embrace these points:

- (1) The surrender to the Chinese court of the four accomplices in the assassination of Mr. Cheng Shi-kang, former Superintendent of Customs;
- (2) Co-operation between the British and Japanese authorities in suppressing anti-Japanese activities in the Concession;
- (3) Establishment of a liaison organ between the British and Japanese authorities;
- (4) Strict control of Anti-Japanese publications, educational and similar facilities within the Concession;
- (5) Dismissal of all anti-Japanese police officers from the Concession force;
- (6) Appointment of Japanese advisers to the British Municipal Council.

However, the parley came to a deadlock on the currency and silver issues.

The Japanese demand that the circulation of the Chinese national currency in the British Concession be prohibited, as is the case in areas outside the Concession, and that the silver stocks in the Chinese banks in the Concession be handed over to the Reformed Government. The Japanese also insist that these questions are inseparable from policing problem because they have an important bearing upon the maintenance of peace and order.

Great Britain contends that the discussion of currency and silver exceeds what might properly termed local Tientsin issues, and that they relate to other economic and financial features of the present situation in North China, hence it is necessary to consult with other Powers which have interests in China.

As if in response to the British contention, the United States and France did intervene in the parley. The United States Chargé d'Affairs in Tokyo called at the Foreign Office on August 8 and emphasized that the United States was interested in the Tientsin currency and silver issues. On the next day the French Chargé d'Affairs also made representations to the Foreign Office that France has common interests with Britain in the same issues.

At this writing the parley remains in a state of virtual breakdown.



Chinese Suspects in Tientsin

It was reported from London, on August 11, that the British Government had decided to surrender the four Chinese in Tientsin accused of complicity in the murder of Mr. Cheng Shi-kang, former Superintendent of Customs, to a local Chinese court for trial.

The British Government had always declined to hand over the men without adequate *prima facie* evidence of their guilt.

Additional evidence, confidentially communicated by Tokyo to the British Government, was carefully examined, and it was concluded that the evidence constituted a *prima facie* case of murder against two men, and of membership of an illegal organization against the other two.

It was pointed out in government circles in London that the issue was dealt with entirely separately from the local issues under discussion in Tokyo and entirely on its merits, and that it had no connection with the temporary suspension of the Tokyo talks, forming in no way part of any bargain.

However, the decision was strongly criticized at Chungking and in London. The Chungking Government lodged a protest on August 12 with the British Government against the decision. A typical view in London was expressed by the *News Chronicle*, which said on August 12 that most people, including the Japanese, would find it difficult to believe that the British Government was handing over these suspects for any reason but one of cynical expediency.

It may be recalled that the British Government informed Mr. Mamoru Shigemitsu, Japanese Ambassador in London, on the eve of the blockade against the foreign Concessions in Tientsin, that these suspects would be handed over, because additional evidence had been brought to light, and requested him to have the blockade postponed.

Be that as it may, the suspects can enjoy the hospitality of the British Authorities in Tientsin, at least for the time being. Acting on instructions from interested attorneys in London, Mr. H. A. Reeks, of Shanghai, well-known British attorney of the firm, Messrs. Ellis and Hayes, filed application for a writ of *habeas corpus* in the case of the four Chinese suspects in His Britannic Majesty's Supreme Court for China. Judge P. Grant Jones in the Supreme Court rejected the application on August 16. The machinery of the law firm was immediately set in motion to carry the application to the Privy Council. Pending the decision of the Privy Council, the Chinese suspects will be held by the British Municipal Council in Tientsin.



War-preparedness in Far East

Sourabaya.—The proposed construction of three new battleships in Holland for the Netherland East Indies will necessitate doubling the facilities of the base at Sourabaya, making it one of the most important strongholds in the Far East, naval sources revealed on July 23. The necessary additions to the naval base, it is stated, would be made while the three battleships are under construction in Holland, so that everything would be ready at the time of their arrival. The present facilities of the base are designed to serve vessels of a much more modest size, the largest based here at the present time being a 7,000-ton cruiser.

When the proposed base is completed, however, it will compare in both size and importance with great British Naval base at Singapore. It is believed that a strong base at Sourabaya would serve to keep an aggressor from attempting to take any part of the Netherlands Indies.

Europeans in the Netherlands Indies are strongly supporting the proposed program. A large mass meeting attended by the four most important European parties in the Netherlands Indies gave almost unanimous approval to the plan.

This wave of enthusiasm has largely served to over-ride objections that an augmented fleet would prove too great a financial burden for the Netherlands Indies to bear. According to present plans, the mother country would build the battleships, but the colony would have to provide for their maintenance.

At the present time there are two cruisers, each of 8,000 tons, under construction in Holland for the Netherlands Indies, while two 3,450-ton light cruisers are also being built.

Based in Sourabaya at the present time are the Java, a 7,000-ton cruiser, and the De Ruyter, which is classed at 6,000 tons. There are also eight destroyers as well as several submarine squadrons and a complement of lighter craft.

A great deal of activity is noted in the arrival of new naval and military equipment, and almost every vessel touching Sourabaya lands a quantity of supplies. This is especially true in regard to airplanes, it being stated in a recent report that over 100 Martin bombers had been delivered in the past three months. The army has also just received five Lockheeds of the latest type, and an expert has been brought from the United States to supervise their assembly.

The Netherlands Indies is also becoming self-sufficient to a certain degree in the manufacture of military supplies, so that it is now possible for steel foundries here to produce modern aerial bombs and other equipment. A huge new gas mask factory located in Bandoeng will soon begin producing masks at the rate of 3,000 a day.

AND IN HONGKONG

After months of preparation and instruction by the authorities, Hongkong, from a technical point of view, is ready to combat the

damage of an air raid at practically a moment's notice, Reuter reported on July 23.

Decontamination squads, demolition parties, first aid units, fire fighters and other Air Raid Precaption squads are ready to move almost at once.

For the education of the people of Hongkong, a large number of handbooks have been printed both in English and Chinese, while there is an official weekly called the *ARP Chronicle*.

Several "black outs" have been staged and preparations are now practically complete for the biggest and most thorough one yet attempted, while separate tests with incendiary bombs will also be made.

Despite the fact that the island of Hongkong is mainly composed of high rocky hills, the proposal for large-scale air-raid shelters and tunnels bored into the rock has been abandoned as impracticable. Instead, large quantities of sandbags will be distributed and instructions on how to make shops and small buildings safe against all but a direct hit will be issued.

A favorable factor in the defense of Hongkong is that raiding planes may only come from one direction to bomb the city of Victoria, which is the heart of the Colony, as it is sheltered by the bulk of The Peak.

In spite of the interest aroused in ARP, there is still a shortage in the number of ARP Wardens, of whom 9,000 are required, and in fire-fighting volunteers, so that the authorities are still continuing their drive for recruits.

AND IN SINGAPORE

A squadron of twin-motored Blenheim and Bristol bombers arrived at Singapore on August 7, as the vanguard of 36 bombers, eight transport bombers and four flying boats now *en route* here from India to double the aerial strength of Singapore's defences.

With the Sunderland flying boats already there, the new arrival will provide a force capable of long-range reconnaissance flights as far as Hongkong. Singapore also will be provided with sufficient bombers and fighters to defend this important British stronghold against a sea attack.

The air force reinforcements were especially welcomed because the land planes stationed there previously had been confined to two squadrons of bombers of an obsolete type, apart from a few new models.

The ease with which the Singapore air force can be strengthened was demonstrated by the arrival of the squadron from India on the night of August 7.

All British air bases between England and Singapore can quickly reinforce the next base along the route, thereby lending Singapore defensive power to meet all eventualities.

The second battalion of the Argyll Sutherland Highlanders arrived there on the same day as part of an estimated 8,000 troops.

Two battalions of Indian troops, the Punjabis and the Hyderabad, accompanied by a company of sappers and miners, arrived aboard the transport *Tilawa*.

Apart from military defence, the Straits Settlements authorities are taking measures for food control. Appointment of a food controller has been announced in the *Government Gazette*. He is Mr. N. R. Jarett, Controller of Customs, and he will be responsible for organization of food reserves for use in case of war.

Food control legislation, including a scheme for rationing and commandeering supplies in an emergency, was passed at the last meeting of the Legislative Council.

The Government is building nine or ten new warehouses in the Malay States to accommodate supplies of padi (rice in husk), which will be available for feeding the population should normal sources of supply be interrupted in wartime. Milling machinery is also being installed so that home-produced rice and the stored padi can be milled quickly.

Siam, Burma and Indo-China are the chief sources of rice for Malaya. Following increased co-operation between the British and French governments in Malaya and Indo-China in accordance with the Anglo-French entente, it is believed the Malayan authorities are depending on Indo-China rice to feed Malaya's population in wartime.

The protection of merchant shipping between Saigon and Malayan ports would be part of the Anglo-French defence scheme in the Far East.

American Woman Slapped

Mrs. Frances Mary Richard, a 59 year old American woman, was slapped by a Japanese sentry at one of the barriers around the foreign Concessions in Tientsin on August 14.

She left the French Concession and went into the Japanese Concession to buy vegetables. She returned and attempted to pass through the Asahi Road barrier. One of the Japanese sentries halted her, as he thought, according to Japanese version, that she was carrying too large a quantity of vegetables for her own use, and that she was abusing the card given to her by Mr. N. Nishida, Vice Consul for Japan. The sentry asked her to show the card, but she refused, whereupon he slapped her across the face. She telephoned to the American and Japanese Consulates-General, and Mr. Nishida personally came to the barrier and accompanied her to the American Consulate-General. A protest was immediately lodged by the acting American Consul-General in Tientsin, Mr. David Berger, with the Japanese Consulate-General.

Japanese statements on the case were rather inconsistent. According to the Japanese Embassy spokesman in Shanghai, however, it appears that the Japanese authorities in Tientsin expressed their regrets over the case and punished the sentry in compliance with military discipline.

The case caused indignation in the United States, and nullified the good effect that might have been brought about by the correction made with regard to the misreported anti-American movement at Kaifeng. It was first reported that all the American residents there had been arrested by the Japanese. The report was denied, however, by Dr. F. Clougherty, an American Catholic missionary at Kaifeng, in his reply to the inquiries of his friends.



U.S. Buys Chinese Silver

The United States Treasury agreed, on August 7, to purchase 6,000,000 ounces of Chinese silver, to be paid for at the price prevailing on the date of delivery. This report was later confirmed at Chungking.

At the present price of 35 cents per ounce, the National Government of China would receive more than U.S. \$2,000,000.

Political quarters, asked for their opinions on this Treasury decision, declared it was "most interesting" and showed "the firm intention of the U.S. Government to pursue without relaxation its policy of purchasing Chinese silver."

Such purchases, they pointed out, "favored Chinese resistance against Japanese penetration."

HONGKONG NEGOTIATIONS

Financial circles in Hongkong admitted, on August 16, that important negotiations had been taking place between financial experts of the Chungking Government and representatives of the Anglo-Chinese Stabilization Fund with regard to the future of the Chinese currency. The same circles declared, however, there was no truth in rumors that China's silver currency was to be abolished and that the negotiations aimed at replacing it by another kind of currency which would be maintained with foreign aid.

It was previously reported that the Chinese side would be represented by Mr. T. V. Soong, Chairman of the Board of Directors of the Bank of China, or by Mr. Tsuyee Pei, manager of the Shanghai branch of the Bank of China. Mr. Cyril Rodgers, Chairman of the Anglo-Chinese Stabilization Fund, the well-known British economic expert and a member of the Bank of England, would also take part in the negotiations.

REMITTANCES RESTRICTED

In an effort to curb the remittance of Chinese national currency to Shanghai from the interior, the Chungking Government announced on August 7 that \$40 will be charged for every \$100 sent to Shanghai. The Ministry of Finance also said that remittances from the interior will be limited to \$100 a week per person.

When asked if the Government intended to cease shipment of legal tender notes to Shanghai altogether. Finance officials replied, "No such action is being considered."

On the other hand, remittances from Shanghai to interior points under the control of Chungking will be made without any charge whatsoever, the Ministry of Finance declared.

Shanghai will not be seriously affected by these measures because the "big four" Chinese banks there possess deposits of legal tender amounting to \$1,000,000,000 which are available for local circulation in the port city, the Ministry of Finance declared.

On the following day, further drastic regulations to restrict the movement of gold, silver and bank-notes were announced by the Ministry of Finance.

These restrictions, designed to strengthen China's war-time financial structure, Finance Ministry officials said, are supplementary to the recently promulgated import control regulations.

Hereafter, only \$500 may be carried out of the country by one person. In the case of foreign currencies, only the equivalent of this amount, as officially fixed by the exchange rates of the Central Bank of China, may be carried from the country, according to the new regulations.

Firms intending to transport bank-notes in amounts between \$500 and \$3,000 to points where money cannot be remitted in the usual way must first apply to the bank for a certificate. If the amount exceeds \$3,000, a special passport must be obtained from the Ministry of Finance.

Transportation of gold or silver will be permitted only after a special passport has been obtained from the Finance Ministry or through the joint committee of the "big four" Chinese banks. Then travellers may carry gold only to the amount of 37.7994 grams, equal to one Customs tael, according to a provision of the new regulations.

Firms desiring to transport silver articles must first seek the sanction of the Ministry of Finance. Individuals, however, may still carry silver to the amount of 188.997 grams—5 Customs taels—without restriction.

Smuggling of articles or failure to comply with import or export restrictions will subject the offender to punishment under the Customs regulations and confiscation of the articles.

Articles which may be exported and which involve foreign exchange transactions, even if transported within China, will be subject to the new regulations. Permits must be obtained for their transportation within the country otherwise the movement of such articles will be interpreted as smuggling. Offenders will be subject to punishment, the Finance Ministry said.

Transportation of gold and silver without the necessary transport permit will subject it to confiscation, the Finance Ministry continued.

Individuals and firms transporting gold and silver articles in excess of the stipulated amounts will be subject to the confiscation of the excess portion whether or not they are in possession of a transport permit for a smaller amount.

Furthermore, individuals or firms who attempt to transport out of the country amounts in excess of that allowed under these regulations, even if they have permits, may have their bullion or notes confiscated.

To enforce these regulations, the Government will post armed police and gendarmes at all important points, Ministry of Finance officials announced.

It was reported in Shanghai on the night of August 4 by the *Credit Men's Bulletin* that the Central Bank, Bank of China, Bank of Communications and Farmers Bank of China had jointly established a commission for the control of domestic remittances, under instructions from the Chungking Finance Ministry. The head office of the Commission is at Chungking, while branches are to be established at various places, except the occupied areas, such as Shanghai.



Japan's Trade Activities

With promotion of Japan's foreign trade becoming an increasingly vital problem in a period of emergency, plans for the organization of a Ministry of Overseas Trade made further progress as Mr. Kazuo Aoki, President of the National Planning Board, arranged a series of conferences with Cabinet Ministers.

Plans for the new ministry have been under consideration by the Board for some time. It proposed to set up a special bureau to acquaint the public with the plans and to gather general trade data.

If the project is approved by the Cabinet the new ministry will take over the administration of the Bureau of Commercial Affairs of the Foreign Ministry, the Bureau of Overseas Trade of the Ministry of Commerce and Industry, the Customs Section and Foreign Exchange Control Bureau of the Ministry of Finance, the Bureau of

Shipping of the Ministry of Communications, and all overseas departments except those dealing with Manchoukuo and China now under the jurisdiction of the Ministry of Overseas Affairs.

Present plans provide for the establishment of a General Affairs Bureau of Negotiations, Bureau of Exports and Imports, Exchange Bureau, Bureau of Shipping, Promotion Bureau, and a Bureau of Trade Plans and Information.

The signing of trade pacts and all other negotiations concerning trade will be under the jurisdiction of the Bureau of Negotiations.

Protection, promotion and control of trade would be under the jurisdiction of the Bureau of Exports and Imports, which would take over the business handled by the second division of the Bureau of Overseas Trade.

Japanese rayon is losing ground in the Philippines and possibly Japan will lose entirely her position maintained since 1930 as the principal source of rayon goods there, a survey by the Institute of Pacific Relations reveals.

The trend in rayon trade is similar to that of cotton piece-goods, the survey said. Last year Japan lost her predominant position as a supplier of cotton goods to the Philippines.

As regards the trade in rayon goods, the survey said that in 1938 Japan still supplied the islands with 86.2 per cent of their imports, but the arrivals from Japan dropped off sharply toward the end of the year, and in the first three months of this year. In the meantime, arrivals from the United States rose.

As a further threat to the Japanese rayon trade in the Philippines the Institute pointed out, the National Development Company of the islands has drafted plans for a 4,000,000 peso rayon plant at Manila as another step in the government's policy of encouraging the native textile industry to reduce imports of cloth which bulk so largely in the customs list.

Sponsors of the National Development Company, the Institute said, hope to stimulate private local production to the point where rayon imports can be eliminated entirely. Scientists, seeking raw materials for the manufacture of artificial silk, have reported that native products available for use include abaca waste or low-cost abaca, rice straw, cotton linters, rags and bamboo.

The most forceful indication of the Japanese loss of the market, the survey said, appeared in the figures on arrivals of rayon piece-goods in the Philippines during the first quarter of 1939. In February, imports from the United States exceeded those from Japan and in March they exceeded the combined total from Japan and Hongkong (which might include some Japanese transshipments).

The American goods, however, the survey said, did not directly displace Japanese goods, but were of a different type, consisting chiefly of sharkskin and similar materials for men's suitings.

Because of decreased imports from Japan, total arrivals were about 56 per cent lower than for the first quarter of 1938, the survey said.

"Whether the American gains will continue through 1939," the survey concluded, "or whether Japan will recoup some of her losses and regain first place for the year, remains to be seen. While the war in China continues and the Philippines plans for rayon manufacture are being pushed, Japan's position in the Philippines market must remain more precarious than in the past."

On the eve of negotiations for a revision and renewal of the trade agreement between Japan and India, which expires in March of next year, the Cotton Spinners' Federation has adopted a three-point petition for submission to the Minister for Foreign Affairs, Mr. Hachiro Arita, and the Minister of Commerce and Industry, Mr. Yoshiakira Hatta, Reuter reported from Osaka on August 5.

The petition asks the Government to conclude a new trade agreement with India along the lines of the Anglo-Indian pact, and also to reduce the quota for Japanese imports of Indian raw cotton and to increase the Japanese quota for exports of bleached and bordered greys by reducing the export quotas for plain greys and colored and other cotton piece-goods.

The petition recognizes the special relations between England and India, and therefore does not demand the same preferential treatment as given British merchandise by India.

In view of the fact, however, that there is a limit to everything, it contends that the Indian tariff on Japanese cotton piece-goods shall not exceed 200 per cent of that on British goods.

The petition urges the Government to conduct negotiations with India for reducing the Indian tariff on Japanese cotton piece-

goods from this point of view, and trusts that Japan's reasonable request, which is based on the new situation arising from the Anglo-Indian agreement, will not be rejected by the British and Indian Governments, "which stand for equity and fairness."

The petition expresses the hope that the relation between the quota for Japanese imports of Indian raw cotton and the quota for Japanese exports of cotton piece-goods will be revised in keeping with the actual situation, in view of the fact that Japanese purchases of Indian raw cotton are being greatly restricted by the Sino-Japanese hostilities.

The petition urges the Government to seek a decided reduction in the Japanese quota for the import of Indian raw cotton, which is now put at 1,000,000 bales annually.

Turning to the classified categories in the Japanese export quota for cotton piece-goods, the document points out that a preponderantly large quota is granted by the current Indo-Japanese agreement for the Japanese export of plain greys and colored and other cotton piece-goods which compete with Indian products, whereas an unduly small quota is stipulated for the Japanese export of bleached and bordered greys, for which there is a large demand in India.

Declaring that this unnatural quota not only causes needless friction between the Japanese and Indian cotton industries, but also adversely affects market quotations in India, the petition trusts that a decrease in the categories of plain greys and colored and other cotton piece-goods in favor of an increased quota for bleached and bordered greys will not merely eliminate the causes of friction and competition between the Indian and Japanese industries but will contribute to mutual prosperity.



Chungking-Hongkong Radiophone

Chungking-Hongkong radio telephone service was formally opened on August 15. Greetings were exchanged between Dr. H. H. Kung, President of the Executive Yuan and Minister of Commerce, and Sir Geoffrey Northcote, Governor of Hongkong. The service was opened to the public on the following day.

Representatives of four Hongkong papers were to have conversed over the radiotelephone with representatives of foreign news agencies in Chungking.

These talks were, however, postponed, as too many other persons, not scheduled to speak, monopolized the radiotelephone during the hour allotted to the Press.

Reception was satisfactory and clear.

It is authoritatively learned that a contract already has been signed for a radiotelephone service between Chungking and Manila.

The Chinese and Philippines Governments are negotiating the question of rates, and as soon as this question is settled, the formal opening will take place.



Regional Armistice Urged by Wang

On August 9, Mr. Wang Ching-wei, former Deputy Executive of the Kuomintang, called upon the Chinese forces in Kwangtung Province to conclude a regional armistice with Japan.

In a 30-minutes broadcast, Mr. Wang, one of the outstanding advocates of Sino-Japanese peace, bitterly denounced General Chiang Kai-shek as "the foe of the Republic of China and of the people of the Republic of China," and revealed that the Japanese forces in Canton were prepared gradually to restore to a full Chinese administration areas now under their occupation, provided the Chinese armies voiced a desire for peace and denounced Communism. Reiterating his conviction that Japanese peace proposals did not infringe upon the independence and the freedom of the State, Mr. Wang flayed the "scorched earth" policy of the Chiang Kai-shek administration.

General Chang Fah-kwei, Commander-in-Chief of the Chinese forces in Kwangtung, counter-attacked the appeal of Mr. Wang Ching-wei for a regional armistice with Japan. General Li Han-hwen, Governor of Kwangtung, also made a broadcast on the night of August 14 and urged the populace of Kwangtung to "rise and kill Mr. Wang Ching-wei. The Kweiyang Cultural Association proposed to erect iron figures of Mr. and Mrs. Wang Ching-wei and place them in public squares as object of public derision, it was reported by Reuter.

General Chiang's Messages

On August 12, eve of the second anniversary of the outbreak of Sino-Japanese hostilities around Shanghai, General Chiang Kai-shek issued two messages, one addressed to the Chinese gentry and educators and another to the Chinese in Shanghai.

In the former, General Chiang emphasized what he termed the necessity of counteracting Japan's schemes by spiritual as well as military measures. He also referred to the furtherance of local self-government program and the improvement of the taxation system.

In the latter he said:

"To-day, all Chinese, whether at the front or in the rear, whether soldiers or civilians, turn their thoughts to Shanghai.

"Everyone is deeply concerned about our fellow-citizens in Shanghai.

"I wish to express my impressions and also my hopes." He went on to appeal to the Shanghai Chinese:

- (1) That the intellectuals and Press form a "spiritual fortress" against Japanese propaganda.
- (2) That economic and financial circles have faith in the Chinese currency to strengthen China's financial and economic position.
- (3) That the Chinese youth in Shanghai realize their responsibilities, and pursue their studies and researches.
- (4) That the Chinese laborers in Shanghai continue their work for the support of Chinese resistance and reconstruction.
- (5) That all Chinese in Shanghai assist each other, and mutually share their hardships, so that the Shanghai Chinese will add a "glorious chapter to the integrity and honor of the Chinese nation and race."

THINGS TO WORRY ABOUT

Everybody's Doin' It

The *Japan Advertiser* of Tokyo in its August 2 issue has on Page 1, Column 2 this headline... "U. S. Watching Japan For Treaty Actions." Also in the same issue, same page, Column 7, is this headline, "Japan Watching U.S. For Treaty Actions."

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Hazards in the Texas Mails

Palestine, Texas, June 15.—Mr. Edwin M. Lockey, Palestine postmaster, is campaigning for fewer snakes in mailboxes. Each year Mr. Lockey makes a routine inspection of rural mail routes served by the office—and each year he finds a snake or two in some of the mailboxes. He is so sure of finding them he carries along equipment for hauling the reptiles out.—*I.N.S.*

* * *

Alas—Poor Hollywood!

Peking, June 21.—The Provisional Government reportedly has planned to organize a motion picture company by August, in line with the efforts to create a new order in East Asia and to promote culture among the Chinese of North China.

The projected North China Motion Picture Company is to be capitalized at 500,000 yuan, half of which will be provided by the Government and the rest by private investment.

The company's headquarters will be in Peking.—*Domei.*

* * *

Defense Measures in Shanghai

The *North-China Daily News* of Shanghai reports that foreign members of the Shanghai Municipal Police will be entitled to receive a \$500 bonus after successfully passing an examination in the Japanese language, according to police orders published, while those passing an easier test will receive a bonus of \$250. The latter, it is stated, will be given an opportunity to obtain the \$500 bonus also, if, after at least a period of at least six months following their passing the first examination, they should be successful in passing the second.

* * *

Scholastic Innovation in U.S.

Mays Landing, New Jersey, July 22.—Boy and girl students as well as their teachers will attend classes in the nude at a new co-educational school to be opened here next September 1, by the American Sunbathing Association, Mr. Harrison Matsinger, director of the project and former lay missionary in China, announced to-day.

The school will cater to boys and girls from the ages of three to 12 and later may include pupils up to the ages of 18, he said.

Already 15 children from New Jersey, New York, Connecticut and California have been enrolled, he added.

Reverend Ilsley Boone, President of the Sunshine Association, said the new school would stress nature study and the traditional three "R's" (reading, writing, and arithmetic). He added that a "normal and sensible" sex course would be included in the curriculum.—*United Press.*

Another Soviet Victory

Cairo, August 22.—The Council of Ministers is understood to have decided to recognize the Soviet Union and to establish diplomatic relations with Moscow on condition that the Soviet Government formally pledges itself not to engage in Bolshevik propaganda in Egypt.—*Trans-Ocean.*

* * *

Maybe So, Maybe Not So

The *Shanghai Evening Post and Mercury* in its issue of August 11 reports that rumors of a huge American Government loan to China were circulating again in the local market. The loan was said to total U.S. \$350,000,000 and to be destined for the financing of Chinese purchases of American goods. These rumors were based upon reports received by local Chinese papers from Hong-kong, but no confirmation was to be secured from any reliable source.

* * *

Crisis in Diplomatic Circles

Washington, D.C., August 13.—Although Prohibition has been over for more than five years, American diplomats who are not permitted to use their entertainment allowances to purchase liquor are complaining to their Government about this anomaly, which often causes them embarrassment abroad.

The State Department has taken the matter up and is debating whether an executive order could be issued which would end the discrimination, without the need for legislation in Congress.—*Reuter.*

* * *

More Help for China—?

London, July 28.—Unconfirmed reports here claim that an exchange of views is being made between Washington, London and Paris for joint support of the Chinese National Government's currency and for joint review of the three Democracies' respective commercial relations with Japan.

It is also rumored that Great Britain and the United States are discussing the possibility of dispatching economic experts to the Far East and that London is considering as its representative Sir Frederic Leith-Ross, economic adviser to the Government.—*I.N.S.*

* * *

Diplomat Steps on Banana Peel

London, July 23.—Prime Minister Neville Chamberlain will shortly call upon the carpet Parliamentary Secretary for Overseas Trade the Rt. Hon. R. S. Hudson, author of the fantastic peace loan plan, regarding which Chancellor Adolf Hitler is demanding an explanation, as to how and why a member of the Government, although not a member of the Cabinet, took such an unusual step as to circulate a scheme of which the Cabinet had no knowledge.

Secretary Hudson revealed that he had held secret talks with Mr. Wohltat, German economics expert now in London and said, "We worked out a scheme together. I planned for a peace loan to Germany not as appeasement but as a conditional one dependent on the disarmament of Germany.—*I.N.S.*

The Emergence of China's Far West

As an aid in understanding the immensity of the task that the Chungking regime has undertaken in creating a new Chinese Empire in the far distant provinces along the western boundaries of the country a most valuable and authoritative treatise recently has been compiled by Messrs. Alvin Barber and Norman D. Hanwell, Research Associates of The Far Eastern Survey. This article, dealing with Sinkang and Sinkiang, is given in the following.

THE remote western regions of China, little known even now in other parts of the country, are assuming an interest for the Chinese people which would have been unthinkable a few years ago. While the influence of China's land frontiers has been felt throughout her history, the forces involved have seldom directly reached the public consciousness, except when conquering hordes in the past have swept down to overrun the land. In recent generations the far western areas have touched the nation's common life only through occasional efforts of the National Government to reaffirm there a sovereignty which has remained almost completely nominal. Both politically and economically autonomy has largely prevailed.

To-day, however, China as a nation faces west; the migration of the National Government has confirmed the clear implications of a movement begun well before the entire coastal area came under Japanese control. Cut off from its seaports, from the trade and financial resources of the coast, national energies are divided between resistance on the eastern battlefronts and the creation of a base to support that resistance in the west. It is difficult to say which offers the greater problem. No part of the frontier has been excluded from the consideration of the National Government in its desperate search to obtain the sinews of war. From its seat at Chungking it surveys the rising Tibetan tableland across the Szechuen border in the newly created province of Sikang and hopes to find there resources which may be useful in the westward reorientation of Chinese domestic policy. Far to the north-west lie the vast borderlands of Chinese Turkestan (Sinkiang), across whose desert wastes runs one of the few remaining avenues of supply for the Chinese armies. Although removed from the present center of the National Government and in fact very largely under Soviet influence, it has its rôle in the national defense and is definitely within the scope of Chinese plans for integrating the frontier areas with the western provinces. Interesting developments are under way in both Sikang and Sinkiang. In the first under direct pressure of the Central Government's necessity, in the second largely indigenous but with Soviet aid. It is the purpose of this article to indicate the play of forces involved and to picture, as far as meager sources of information permit, the present status of these outposts of China's far west.

I. Sikang

On New Year's Day 1939 appropriate ceremonies marked the founding of the new province of Sikang. Containing an area variously estimated from 145,000 to 175,000 square miles, roughly between three and four times as large as the State of New York, its boundaries are still unsettled and have been altered several times. The greater part of the province was formerly included in one of the special administrative districts set up in Nearer Tibet following the differentiation of this area from Farther Tibet by the British-Chinese-Tibetan agreement of 1914. In 1928 Sikang was reorganized, although the territory did not yet bear its present name, and for the past three years it has occupied a provisional status while preparations were made for forming the provincial government which has now been installed. Of the thirty-two hsien initially included in Sikang, only those in the eastern section have been consolidated under central control. These were originally taken from Szechuen and added to the Tibetan areas. The western part of the province, about three-fifths of its area, is still chiefly under Tibetan influence, which has frequently countered Chinese penetration, and remains Tibetan in character. The boundary line marking the present limits of Chinese authority is Chin-sha Kiang, or Golden Sand River, a tributary of the Yangtze, which drains the province. Recently further sections of the Szechuen borderlands have been incorporated

in eastern Sikang so that the present boundary on that side is now near Yachow (Ya-an), stronghold of the war-lord General Liu Wen-hui, who governs the new province but who seems, from all reports, hardly an ideal instrument of new Chinese nationalist policy.

A Mixture of Races

Geographically, Sikang is the bridge between China and Tibet. It shares the rough, mountainous character of the latter, and as a buffer fronting on the British sphere of influence it might conceivably become as important in the defense of China as Manchuria was against the different imperialisms of the north. Ethnologically, the province is a mixture of races. About one-third of the population is Tibetan and another 40 per cent is composed of the Sikang natives, the Hsi-fan people. Near the southern boundary are found Miaos, Yaos, Lolos, Payis and Mosos. The Chinese are, therefore, a decided minority in the province and are concentrated in and around the eastern towns. No accurate figures can be given for the total population, and estimates range from 968,000 to three or four million. The population of certain typical eastern hsien cities has been reported as follows: Tatsienlu (Kangting), the new capital of the province, 45,000, of which 60 per cent are Chinese, 10 per cent Tibetan and 30 per cent Hsi-fan; Batang (Pa-an) most western major settlement in the Chinese area, 30,000, of which 50 per cent are Chinese, 20 per cent Tibetan and 30 per cent Hsi-fan; Kan-tzu with a population of 20,000, of which 70 per cent are Hsi-fan people predominate. These estimates, possibly made during markets or fairs when the rural population swarms into the towns, may be too large; smaller totals have been given. Other average hsien towns show populations of 5,000, 2,000, 1,500, 1,200, 300 and less. Until recently only a few districts had telegraph service and only twelve hsien, about one-third of the total, boasted postal connections, ten with postal representatives but only two with post offices.

In its physical aspects the country is forbidding; the elevation of the Tibetan plateau on which it lies is above 3,000. It is a land of deep valleys and mountain ranges which rise, especially in the west, to heights challenging the celebrated peaks of the Himalayas. More than one half of Sikang's area is covered with virgin forests, and the Tibetans, Fans and other tribesmen live a nomadic existence. The physical obstacles alone in opening up this country are extraordinary and the transportation routes are those of a past age. Yet it is here the Chinese hope to find a "prosperous and rich reservoir of New China." What is the basis for this hope beyond the government's desperate need?

Large Gold Deposits Claimed

There are certain mineral resources, but in quality and extent quite beyond accurate estimate on the basis of present information. Gold has been mined for some years and is considered one of the greatest resources of the province. For 1930 the Geological Survey of China reported the production of 15,850 taels of gold, valued at Ch.\$1,109,500, for Sikang and Szechuen together, but what proportion came from each province is not indicated. It is expected, however, that production in Sikang can be increased by intensive effort and more modern methods. The gold deposits in the east are scattered and apparently, until very recently, have not been worked as much as in the past. The central region of the province is richest in gold, which occurs with some frequency along the rivers of that area. Here the Chinese say, "wherever straw sandals leave their prints the entire district is filled with yellow metal." The poetic license of this hopeful legend is unfortunately offset by several very hard facts. Food is scarce in all that region, is difficult to bring in, and the gold, when mined,

must be transported several hundred *li*—sometimes more than 1,000 *li*—by primitive methods. The height and coldness of the region, which is icy more than half the year, are real hardships. Living conditions are poor, and labor is scattered and difficult to obtain. The safety of wayfarers and prospectors is not secure against attack and the richest sections are apparently not yet in Chinese hands; the Hsi-fan who predominate have other ideas of what is precious.

There is also some copper in Sikang, although not developed, some silver, and some lead, which is produced on an extremely small scale—a mere 15 tons in 1930. In the same year the province produced 3,500 piculs of salt, valued at Ch.\$35,000. West of the Chinsha River, where there has been little exploration, much lime has been reported and some petroleum, in regard to which the more enthusiastic nationalists make extravagant claims. Better founded are the estimates of available sulphur. Apparently Sikang, north-west of Tatsienlu, offers the best source of natural sulphur in all China, but very little development has taken place. Although the last report of the Geological Survey of China at hand contains no mention of iron in this area, it is now said that the largest iron field in China (80,000,000 tons) is found along the Sikang-Szechuen boundary. This estimate must be reduced to a mere fraction of the figure mentioned, but it is safe to say that there is some iron. Yeh Hsiu-feng, Reconstruction Commissioner for Sikang, has recently indicated that a special appropriation has been made in his department for the development of modern smelting methods in the Mien-ning region.

Plans Over-optimistic

Sikang, of course, with its mountainous topography and many streams, has an abundance of water power. The government expects to tap these power resources and is now constructing an experimental hydro-electric station along the Szechuen-Sikang border. A plan has been made for the division of eastern Sikang into five industrial belts: the Yachow-Luting area, to be set aside for the development of light industry; the Mien-ning district, for heavy industry; the Taining region, for grazing; the Yalung River valley, for metallurgy; and the Yuehchun-Mien-ning Plain, for agriculture. So systematic an organization of the province lies well in the future, especially in regard to the heavy and metal industries. If the National Government has been able to make little progress with its industrialization program in the more accessible provinces of the south-west, it can hardly do better when facing the far greater difficulties which Sikang presents.

More realistic in terms of present conditions is the suggestion that large-scale development of the Sikang wool industry be undertaken to replace the cotton industry which was disorganized when Shanghai mills were almost entirely destroyed. In the last analysis the three greatest resources of Sikang will probably prove to be its timber forests, gold and animal husbandry, and of these the latter offers the most hopeful future. Hides and wool rank among the most important products of the province with an annual export of about Ch.\$500,000 at the present time, a figure which could be raised substantially. A leather tannery is now in process of construction in the Yachow district.

The government intends to encourage agriculture, and the Farm Credit Administration has announced its readiness to extend credits to Sikang farmers for development of irrigation canals in the farming areas. The funds available for this purpose will necessarily be small, and the country, in any event, is not ideally suited for agriculture since its many steep valleys contain only limited areas available for crops. However a considerable number of the Chinese engage in farming, and the present rice production is reported at 1,870,000 piculs. In the existing stage of economic development, tea and medicine are among the most flourishing export commodities, the latter including various medicinal herbs and the cherished Chinese tonic made from the horns of deer and elk. The brick tea of Yachow is famous and is its main product. The amount produced exceeds 2,000,000 chin (or kin) annually and is marketed to the extent of Ch.\$2 or three million in Sikang and Tibet. Although the trade is not what it was in the past, and tea from India has so invaded the market that production has been affected, the Szechuen and Shansi merchant groups are still transporting Yachow tea by the old methods on the backs of carriers.

Yachow is not only the gateway of Sikang and Tibet, but it is the most considerable city of the Sikang area, the most advanced

economically and the most closely linked with China proper. Consequently more reliable information is available for Yachow than for other parts of the province, and a brief consideration of the situation there furnishes an insight into the present level of economic development and the many problems facing the government. When Yachow was a part of Szechuen it was considered a third-class *hsien*, but since its incorporation in Sikang it has been made a first-class *hsien*. The population is about 130,000.

Poverty Widespread

In the Yachow district, in addition to the hydro-electric plant and the tannery previously mentioned, a saltpetre factory has been erected, and irrigation construction is projected to make possible the production of some 10,000 piculs of grain annually. These measures reflect the tentative beginnings and present modest results of the government's development program. Although the use of money is uncommon outside the larger towns, there are seven banks in Yachow, including the Szechuen, Sikang and Chungking banks, but the money market is largely in the hands of the tea and medicine merchants. Despite these relatively flourishing trades, the inhabitants of the region live in poverty. The district does not produce enough food to support the local population and the yield of the land tax and other exactions hardly provides the meager sum Ch.\$120,000. Opportunities for improving the condition of the population under present conditions are negligible, and the same situation is found elsewhere throughout the province. Deserted wasteland has increased at Yachow and its labor strength has greatly diminished. In a recent investigation published in the *Chungking Hsin-Hua Jih-Pao*—a communist paper which is regarded as fairly reliable—it was found that from 40 to 50 per cent of the local inhabitants are opium addicts, including most of the transport workers, who expend on opium from 40 to 50 cents of their average daily earnings of 70 to 80 cents. Among the peasants opium addiction is somewhat lower, but in villages near Yachow 30 to 40 per cent of the population use the pipe. The serious consequences for the people's livelihood and the strength of the race require no emphasis, and the government is accordingly faced with the necessity of enforcing prohibition of opium.

That the National Government will make every possible effort to develop Sikang may be taken for granted, but sensational results are hardly to be expected. It will be rather a matter of very gradual progress in overcoming great difficulties. Of first importance is the question of communications. In a province so mountainous and austere, whose population is too small to build roads, costly expenditures for equipment and man power are necessary if the present rude trails are to be replaced with adequate transport facilities. Some steps have been taken. Yachow is linked by motor routes to Chengtu, in Szechuen; but westward, although work is in progress there, one must still travel by foot or by horse or chair, and almost all goods are transported on the backs of carriers. The distance from Yachow to Tatsienlu (Kangting) is about 500 *li*, yet this trip requires eight or nine days, and at Tatsienlu one has hardly entered Sikang proper. In the west an interprovincial route links Sikang with Tibet. It is roughly in the same stage of development as the Yachow-Tatsienlu road, which in turn is far more improved than the dangerous trails in the central part of the province. No more formidable problem faces the national and provincial governments than the improvement of the routes of communication without which it is an utter impossibility to integrate the life of the province.

Subsidies Vital

As the foregoing discussion has indicated, there are other major issues to be faced. Lack of capital is serious. Sikang itself, with most of its inhabitants still in the barter stage of trade, is far too poor to provide the sums necessary for its rehabilitation. The present budget of about Ch.\$5,100,000, while exorbitant considering the status of the population, is hardly sufficient even to make a beginning with the elaborate development program which has been laid out. Subsidies from the hard-pressed Central Government are vital. The shortage of labor is almost equally serious. Colonization will have to be attempted on a fairly extensive scale, and the hard and often dangerous life of the province offers no great attraction to settlers. Finally there is definitely a problem of colonial administration. In the past the population

of the province, 80 per cent of whose people are not Chinese, has suffered oppression and violence at the hands of Szechuen troops. Relations between Chinese and non-Chinese have not been amicable, though both the Tibetans and the Hsi-fan people in recent months have pledged their aid in the Sino-Japanese war. China needs the co-operation of its frontier peoples, and the National Government doubtless knows what it must do to obtain it. "The Sikang authorities," remarks a recent Chinese writer, "are tackling the problem in a cautious way in accordance with the guiding policy of the Government concerning border affairs: to win the heart of the tribesmen through the institution of a clean administration and to respect their religious and social customs." Effective control in the province, however, remains with the war-lord governor, General Liu Wen-hui, and whether or not he shares the present benevolent intentions of the National Government remains for the future to disclose.

II. Sinkiang

In contrast to the southern province of Sikang, Sinkiang—or Chinese Turkestan—constitutes the north-west frontier of the Republic, stretching over vast distances in the heart of Central Asia. Bordering the Soviet Union along its entire western edge, it reaches from the Kunlun mountains, which mark the northern boundary of Tibet, to the Great Altai range of Mongolia. Within these limits lies a territory variously estimated from 400,000 to over 600,000 square miles—an area, at the lower figure, roughly, equivalent to the entire eastern seaboard of the United States, from Maine to Florida. It is sparsely inhabited by a mixed population of not more than four million, including Mongols, Kasaks, Manchus and the majority "race" known as the Chantou, themselves a mixed people who comprise 60 per cent of the population. Also included are naturalized White Russians to the number of about 60,000, representing chiefly traders who came to Sinkiang in Czarist days and others who have since fled from the Soviet regime.

Though considered a part of China since the Manchu conquests, only one-tenth of Sinkiang's population is made up of inhabitants of Chinese blood, most of whom belong either to the governing or the trading classes. The tenuous sovereignty of the Chinese National Government, vested in a provincial administration far removed from central control, has frequently been acknowledged only through the courtesy of the governor. As frequently it has been assailed by ambitious war-lords, Mongolian and other nationalists and crusading Moslems, whose interfactional and inter-racial quarrels periodically disturbed the peace of the province. In the early thirties Sinkiang was a hotbed of civil strife. Chinese forces, with what support the National Government could muster, fought to regain control. The White Russians of the province, most of whom had become naturalized, were impressed into the army to face revolting Moslems, in accordance with a traditional policy which has aimed to play one race against another. Chinese troops, driven from Manchuria by the Japanese, arrived via Siberia to take up arms again in the west. These varied forces marched and countermarched within the province, but it was not until Soviet troops appeared on the scene that a semblance of order could be restored.

Soviet Influence Ascendant

For more than a decade Soviet influence has been ascendant in Sinkiang. One reason, of course, was the general gravitational attraction of a powerful neighbor on an area with no very strong attachment elsewhere. There were also more specific causes. In the past faint caravan trails conveyed much of Sinkiang's external trade over the long and desolate route which led directly to China Proper. About 1925 this trade was completely disrupted along its usual course by banditry and civil war in other provinces of China. It was turned instead across the Soviet border where superior transport facilities recently developed have held it fast. In addition, following the assassination of Yang Tseng-hsin, Governor of the province for seventeen years, his successor concluded a trade agreement which conceded many privileges to the Soviet Union without the knowledge of the Chinese Central Government. It encouraged both the exchange of goods across the border and the co-operation of the Soviet Union in the development of the province. As a result the Soviet Union acquired a virtual monopoly of Sinkiang's economy. "Economically," Owen Lattimore remarked several years ago, "it (Sinkiang) can no longer be considered anything but a province of the U.S.S.R."

Politically, although the Soviet Union has shown no present disposition to interfere with the administration and institutions of the province, any Sinkiang regime exists on Russian sufferance. The plain fact of the situation is that the Soviet Union has been in a position to exert its influence in Sinkiang and has done so not only to promote trade but to pacify its borders and strengthen its defenses against possible Japanese flanking movements after the occupation of Manchuria. The Chinese National Government on the other hand has been in no such position. Yet China is far from considering that the province is lost to her. If her ties with the area are attenuated, they have been so in the past. The Soviet Union has challenged Chinese sovereignty, and the provincial government acknowledged it. Present Soviet and Chinese policies along their common border share a mutuality of interest, and China expects to profit from the unification and development of Sinkiang, however attained.

Active Reform Program

As with Sikang, sources of information about this vast province are meager, frequently prejudiced and exasperating in their lack of reliable detail. It is apparent, however, that much has been happening in Sinkiang in recent years under the leadership of the present military governor, General Sheng Shih-tsai. From his accession on April 12, 1933, although he was not recognized until later by the National Government, the Chinese date the beginning of a new and better day. The cessation of civil warfare, an indispensable preliminary to any development, seems to have been largely accomplished, and Russian troops are no longer found in the province. Racial equality has been fostered by opening the civil and military services to all peoples of the province on equal terms with the Chinese and by the development of schools to which all races are admitted at government expense.

Again, an honest and efficient administration has been sought, primarily through the inauguration of new financial policies—a point of cardinal importance to the province. Because of past civil wars and the ensuing inflation of the provincial paper currencies, the exchange value of Sinkiang currency with Central Government currency fell tremendously. There were inevitable results. The reform or even the calculation of government finances was practically impossible. The method of trading reverted from one of money to the primitive form of barter. Market prices were extremely uncertain. Monetary official wages increased 200-fold because of the inflation. But the prices of goods increased two or three hundred times for the same reason. Officials, finding their standard of living reduced, lost interest in their duties, and many, it is surmised, when in a position to do so, introduced petty taxes of their own to eke out their salaries. To reverse this situation, several reforms were instigated: (1) the introduction of a budget—previously unknown in the province—in all government departments; (2) increase of revenue and decrease of expenditure, leading towards a proper balance; and (3) drastic reform of the monetary system. Besides the introduction of a budgetary system, there has been established a financial supervisory committee, which is authorized to audit public accounts, and a training institute for public finance personnel. Through these means it is claimed that a noticeable improvement has taken place since 1933.

Revenue prior to 1933 was not unified. In addition to the simple practice of printing money almost at will, the war-lords levied taxes and demanded military requisitions to an extreme degree. Subordinate officials added their bit by severe local exactions. In the period immediately following the 1933 coup which brought General Sheng into power, this condition was so far from improving that the tax burden tended to increase with the introduction of new exactions. Only since the latter half of 1936 has Sinkiang gradually been unified; and its tax system has shown a similar trend as many of the harsh miscellaneous taxes which so hampered China during the transition period of warlordism were gradually removed. Sinkiang, whose tax sources have not been economically very productive of revenue, has retained control of taxes which elsewhere go to the National Government—for example, the customs, land tax, wine tax and stamp tax. There are seven customs offices, and all officials of the service are appointed by Sinkiang Province, not by the Chinese Central Government—Figures available for 1936 reveal a customs revenue for the province of Ch. \$3,340,000, a land tax revenue of Ch. \$2,430,000, and a cattle tax revenue of Ch. \$24,880. These returns are claimed to be from two to three times what they were before the 1933 coup.

Since one-fourth of Sinkiang's population is nomadic in character, the ownership of land, save in the larger cities, is not easy to establish. This situation naturally makes the collection of the land tax difficult. The problem involved has been generally recognized. The Third All-Sinkiang Conference, held in the provincial capital, Tihwa, from September 31, to October 11, 1938, and attended by some 636 representatives selected from 14 different racial groups, was the most recent internal political development of note. Important resolutions affecting the economic development of the province were adopted, and a program calling for the complete demarcation of land holdings had a major part in the proceedings. When completed it is hoped that the increased land tax will enrich the provincial treasury to a considerable degree.

Branch Banks Established

Together with the unification of the currency system, the reform of the provincial financial structure has seen the establishment of fifteen branch offices of the Sinkiang Provincial Bank throughout the province. The capital of this bank is made up of treasury notes of the provincial Finance Department, the amount of which cannot be ascertained. In 1938 the Central Bank of China for the first time established an office in Tihwa, chiefly to assist in the process of exchange between Sinkiang and China proper. The Central Government has also established several agencies in Tihwa, and it is claimed that there is already Chinese legal currency to the amount of Ch.\$1,000,000 circulating in Sinkiang (each dollar figures here at the rate of 4,000 Sinkiang taels to the dollar). There are clear indications of the National Government's interest in developments in its north-western province.

Efforts at economic reconstruction in Sinkiang have followed upon the reform of taxation and the financial system. Although the terrain is easier than in Sikang, the development and extension of the routes of communication are of great importance. During the past few years thousands of miles of highways have been laid both within Sinkiang and as connecting links with Mongolia, Tibet and China's north-west provinces. It is said that Sinkiang has already spent U.S.\$500,000 on improving road conditions and maintaining repair shops and service stations for motor transport. Most important of the highways now in use is, of course, the long road connecting the Soviet Union with China Proper which crosses Sinkiang and thus re-establishes the direct physical link between the province and the rest of the nation. It is this road which has become one of China's main supply routes for munitions, although dependable information as to the state of the trade is naturally unavailable.

Loans to Farmers

The provincial government has also sought a well-developed agricultural economy to replace its fundamentally nomadic system. In 1938, it is claimed, cash loans amounting to a million dollars, Chinese, were extended to needy farmers. Efforts were initiated to revive the silk industry, formerly an important rural occupation, by the purchase of cocoons for distribution. In addition there have been established (reports on their efficiency and number are not available) agricultural improvement centers, forestry bureaus, veterinary hospitals and credit organizations to assist the peasants both technically and materially.

The mineral resources of the province have received attention. Although these are undeveloped in the modern sense and are mined by primitive methods, they are not inconsiderable. There is no information as to how far production has advanced in recent years or what production could be expected after the introduction of modern methods stimulated by a local demand, which in most cases does not exist at present except in a limited way. For 1930, however, the Geological Survey of China reported the following production in Sinkiang: 12,000 taels of gold valued at Ch.\$840,000; 100,000 tons of bituminous coal valued at Ch.\$800,000; 250,000 piculs of salt valued at Ch.\$2,500,000; 200 tons of iron and an additional 500 tons of iron ore; ten tons of sulphur; and 300 barrels of mineral oil. The petroleum, however, is of low grade.

A program of industrialization rounds out the government's projected rehabilitation of the province. Chinese reports indicate that modern cotton mills are to be found in Tihwa and other large cities of the province. It is claimed that there are new power plants, flour mills, tanneries, oil refineries and even automobile

repair shops where formerly there were none. In November, 1938, the Sinkiang Printing Company was established in Tihwa, occupying a plant costing U.S.\$300,000 for machinery, plus Ch.\$400,000 for costs of construction and transportation. It is to print Sinkiang's paper currency as well as literature for distribution among the inhabitants of the province. A new powerful radio station to cost U.S.\$250,000 is planned for the future.

In all these projects Soviet influence is to be seen. Not only has Sinkiang obtained its industrial equipment and certain technical assistance from the Soviet Union, if the best available evidence offers any guidance, but it has also applied to this neighbor country for financial aid in carrying out its industrialization program. The resources of the Soviet Union and its apparent willingness to make them available in a modest way are plausible evidence that development of the province can proceed far more rapidly than in Sikang, which is hampered by the present physical impossibility of obtaining needed industrial machinery and by its dependence on the uncertain finances of the Chinese National Government. Moreover Sinkiang has its own three-year plan, drawn up by the specialists of Soviet Russia's first five-year plan and adjusted to actual conditions as a result of their earlier experience. "Cooperation with the U.S.S.R. has made economic reconstruction progress in leaps and bounds," remarked one of the more effervescent Chinese writers. "With a loan of 5,000,000 gold roubles without interest (other accounts report 4 per cent interest paid) and a small group of Soviet technical advisers, Sinkiang is fast becoming a modernized province. A network of highways, free medical clinics, free education, electric lights, modern agriculture and medical services are only a few of their achievements." Discounting the obvious enthusiasm of the writer, it seems safe to assume that definite progress has been made in Sinkiang's reconstruction.

Trade Primarily with U.S.S.R.

The self-contained nature of Sinkiang's trade, which has long been characteristic of the province, is a natural result of centuries of geographical isolation, coupled with the primitive organization of its society. The external trade of the province, however, attains a volume definitely affecting conditions of livelihood within its borders and important enough to influence the direction of its "foreign" policy. Inasmuch as Sinkiang's "foreign" trade to-day is either with the Soviet Union or is routed through Soviet territory, the standing of this trade can best be found through analysis of Soviet trade figures. Those of Sinkiang are unavailable. Soviet statistics provide no itemized list since August, 1937, but totals are at hand. The change in value and nature of the currency units used from year to year makes it necessary to rely more on tonnage figures, inadequate though they are, to obtain the general trade picture. During the past several years the total tonnage of exports from the U.S.S.R. to Sinkiang has shown a steady increase, and this without the inclusion of the special trade in military supplies known to be passing through the province. For 1935 the total was 20,113 tons; 1936, 22,786 tons; and 1937, 25,733 tons. For nine months only in 1938, the latest available, the total tonnage of exports from Russia to Sinkiang was 21,035, indicative of a trade still increasing.

Imports into the U.S.S.R. from Sinkiang show a similar steady increase. Total tonnage of imports from Sinkiang from 1935 was 26,665 tons; for 1936, 28,498 tons; for 1937, 28,990 tons. The first nine months of 1938 show a total tonnage imported from Sinkiang of 27,698, again indicative of a growing trade.

The character of the trade can be best seen from a glance at a table showing tonnage and values of major imports and exports for the first eight months—January to August—of 1937.

EXPORTS FROM U.S.S.R. TO SINKIANG, JANUARY-AUGUST, 1939

	Tons	Thousand Roubles
Cotton goods	1,656	7,432
Tea	1,144	2,018
Sugar	2,592	1,033
Clothing	67	963
Transport vehicles. . . .	455	927
Petroleum and products..	3,693	884
Shoes	95	628
Consumption metal goods ..	449	531

The main imports of Sinkiang from the U.S.S.R. would seem to be wearing apparel, including in that term the trade in cotton goods, clothing and shoes. The tea trade is interesting as a clear indication that the more economical trade route between Sinkiang and China Proper lies through Siberia, as against the apparently more direct yet slower route overland.

IMPORTS TO U.S.S.R. FROM SINKIANG, JANUARY-AUGUST, 1937

	Tons	Thousand Roubles
Live animals	7,422	2,878
Hides	1,868	2,519
Wool	1,872	2,390
Cattle intestines	128	2,117
Furs	105	1,582
Raw silk	115	1,235
Cotton	930	1,041
Hair	181	425

Livestock Leading Export

The nomadic character of Sinkiang's economy is evident from the nature of its exports shown in the above table. The importance of the livestock imports to the national economy of the Soviet Union owing to the Soviet livestock shortage was indicated in a study of the Soviet "Economic Stake" made for the Far Eastern Survey a few years ago (January 29, 1936). The presence of cotton and raw silk in the list of Sinkiang exports seems to indicate a

development, or extension—for Sinkiang has produced raw silk in the past—of an agrarian base for her economy.

As has been indicated Sinkiang's trade now flows toward the Soviet Union largely because of the transport facilities offered there, an advantage fortified by the opening of the Turk-Sib Railway in 1930 passing within a short distance of the Sinkiang border, to which it is linked by a motor highway. Reports have been current for some time that a short rail line is now being constructed along this highway route. To compete with the Soviet Union it would be necessary for the Chinese of China Proper to provide an equally economical means of transportation overland to Sinkiang. Formidable difficulties stand in the way. As Owen Lattimore pointed out a few years ago, "no railway from China can tap Sinkiang without first crossing one or another stretch of economically sterile country, where expensive engineering cannot be financed out of immediate freight profits; . . . it is doubtful whether Chinese political urgency will be sufficiently strong to secure financing for lines not immediately productive."

Yet the rapidity of Chinese rail and highway construction under war pressure has been a remarkable development of the past several years. The East-west railway which passes through Sian in the direction of Lanchow (and Sinkiang) has already been extended, although to be sure for only a short distance, and the present "political urgency" manifested in war-torn China may yet operate to force a railway into Sinkiang. Such a railway would more closely and more quickly connect China with the Soviet Union and with Europe, providing routes of external communication relatively free from the danger of hostile attack. Such a railway would provide a firm internal tie, linking the north-west frontier within an integrated Chinese nation.

British Interests in China

FOUR years hence, Shanghai will celebrate its centenary as an open port. By the Treaty of Nanking which was concluded between China and Britain in 1842, at the close of the Opium War, China agreed to cede Hongkong to Britain, and open five ports—Canton, Foochow, Ningpo, Amoy and Shanghai—to foreign trade. It was in 1843 that Shanghai was actually opened to unmolested trade and residence of foreign "barbarians."

In the past century Britain has acquired in China vast economic interests which are exceeded by no other country—not even by her rich and close friend across the Atlantic. The direct business investments of the United States in all of China was estimated by Mr. Cordell Hull, Secretary of State, at about \$132,000,000—about the amount the American people spent in 1937 for chewing gum; about one-eighth of what they spent in 1937 for cigarettes. Their total stake in the whole Far East amounts to \$750,000,000, including such indirect investments as bonds, missionary property, etc.

Europeans were lured to the Far East by the tales of gold. In 1620, a British ship drifted to shore in China near Macao on her way to Japan, perhaps in quest of gold. In 1635, another British ship, which was chartered by the Portuguese Governor of Goa, came to Macao, to transport copper and firearms. Probably the copper had been obtained from Japan by the Portuguese traders. After that British traders came to China, mostly to Canton, Foochow, Amoy and Formosa, and bought tea, silk, zinc, etc. and paid in silver. The Chinese Government officially permitted foreign trade in 1685, but limited it in 1757 to the port of Canton only. The balance of Anglo-Chinese trade in these days was decidedly in favor of China, for Britons had nothing to sell to China, and had to pay in silver.

Britain found the way to balance the trade in the sale of Indian opium. Opium was the foundation of the fortunes of the British traders. The Chinese Government, which prohibited opium smoking in 1813, placed a ban on its importation and sale. However, opium smuggling continued, so Governor Lin confiscated and burned the opium belonging to the British traders in Canton, and caused a war in 1840. There was much apparent insincerity about the attitude of the Chinese officials in dealing with the Britons, but this is beside the point. The point is the importation of Indian

opium, which the Chinese Government had the right, and was trying, to suppress.

After the Opium War, Britain never missed a single opportunity to augment her interests in China. And the corrupt mandarins under the Ching dynasty had to yield to her demands. Other Powers must be thankful for Britain, who bore the brunt of the work of opening the doors of China to foreign trade and intercourse.

It is often said that Britain sought only economic interests, and not political. However, economic and political powers are inseparable. Behind a political rivalry in modern history, there is always economic competition. Mammon is all-powerful, and often works hand in hand with Mars.

By many treaties with China (unequal treaty, so-called by the Chinese) concluded after the Opium War, Britain established her predominating position in China. During the remaining period of the nineteenth century, Britain created agencies to do the pioneer work in the promotion of China trade and the development of the interior districts. The Chartered Bank of India, Australia and China opened a branch in Shanghai and the Hongkong and Shanghai Banking Corporation was created in Hongkong. These banks and Messrs. Jardine, Matheson & Co. were in the vanguard of the economic advance of Britain in China.

The doors of China were kept open from 1842 to 1895, when the Sino-Japanese War ended in the victory of Japan. China, regarded as a "sleeping lion," was proved to be a "dead lion" and the Powers began a struggle for spheres of influence. The territory of China was carved bit by bit by the Powers—under the name of leased territory, concessions, settlements, and the like.

To put a stop to their mad scramble for territory, John Hay, American Secretary of State, issued a note in 1899 called the policy of the "Open Door." The note was delivered to London, Berlin, St. Petersburg on September 6, Tokyo on November 13, Rome on November 17, Paris on November 21, and these Governments endorsed the now so-called "Open Door" policy.

It was John Hay who issued the note, but it was not he who inspired the "Open Door" policy. It looked in 1898 as though two of Britain's traditional enemies, Russia and Germany, were ready to seize control of the rich territory of China, and British

trade supremacy was threatened. Russia was invading Manchuria, and Germany had advanced into Shantung. Britain had the lion's share of China investments and desired to maintain the *status quo*. The "Open Door" or "equal opportunity" meant continued British domination in China. Britain felt, as is always the case, it might be better if someone else advocated the preservation of the *status quo*. Britain was already stained with her own establishment of a sphere of influence in the Yangtze Valley, and could hardly preach a doctrine which she herself was unable to exemplify. On March 1, 1898, the House of Commons passed the resolution:

"That it is of vital importance for British commerce and influence that the Independence of Chinese territory should be maintained." In the same month, the British Government confidentially invited the co-operation of the United States to prevent violations of what they now called the "Open Door." President McKinley declined the invitation, as he was preoccupied in Cuba. One year later, he took the opposite view, because of Uncle Sam's expansion in the Pacific backed by powerful financiers. John Hay, a great advocate of an Anglo-American alliance, was newly appointed Secretary of State. It is significant that Hay's note was first sent to London, Berlin and St. Petersburg. The reason is that Britain had indirectly sponsored the project, and the immediate causes were German concessions in Shantung and Russian concessions in Manchuria.

The World War checked the activities of the Powers in China, and Japan gained supremacy in China trade. After the war, activities and rivalries were resumed. However, they had to encounter various obstacles since there had appeared in the arena Japan and the Soviet Union, and China was in a revolutionary mood and vigorously demanded abrogation of "unequal treaties" and foreign concessions. Britain was naturally regarded as the champion of imperialistic aggression in China, and the British Concessions at Hankow and Kiukiang were forcibly seized by the Kuomintang Government in 1927. Britain issued a statement in December, 1926 and January, 1927, expounding a new liberal policy toward China. Since then Britain has maintained her position and influence in China by co-operation with, and support of the Kuomintang Government.

The co-operation between Britain and the Kuomintang Government became closer after the Manchurian Incident. The most notable instance is the reorganization of the Chinese currency system effected by Sir Frederick Leith-Ross in 1935, whereby the Chinese Dollar was linked to the Pound sterling.

Mining and Industry

Of the numerous British mining and industrial interests in China, the most important is the Kailan and Mentoukou mines in Hopei. Britain once obtained mining concessions in Shansi, Szechuen and Yunnan, but abandoned these later. However, the fact should be remembered, in view of the plans mapped out by the Chungking Government for the development of south-western provinces, and the British policy of lending support to that Government. The Kailan mines are exploited by the Kaiping Co., a British firm, and the Lanchow Co., a Chinese firm, which are administered by the Kailan Mining Administration in Tientsin. The capital of the former company is £1,960,000, of which 70 per cent is in British hands, 20 per cent Belgium, and two per cent Japanese. The capital of the latter company is £1,000,000, 30 per cent of which is British-owned, 30 per cent Belgium, and 40 per cent Chinese. The total investments of the two companies are estimated at £3,500,000.

Japan tops the list of foreign interests in the cotton mills in China. However, the British-owned Ewo Cotton Mills, Ltd., is a major enterprise with the paid-up capital of 5,400,000 Taels.

Cigarettes in China are mostly supplied by British firms, all affiliated with the vast concern, British-American Tobacco Co. As the name indicates, American capital is invested in the company, but the ruling power is in the hands of the British.

As Britain was the pioneer in opening the ports of China, it is natural that most of the public utilities companies in port cities are under British management.

Trade

The amount of the China trade of the British Empire far surpasses that of any other country, although the United States

and Japan are formidable competitors. In 1937, 35.6 per cent of the total exports from China, and 21 per cent of the total imports to China, were shared by the United Kingdom and her dominions and colonies.

The fact should not be overlooked that the Maritime Customs of China is under the supervision of the British. The Chinese Customs was placed under the management of a tripartite committee, Britain, the United States and France, in 1854. In 1898, British Minister MacDonald in Peking persuaded the mandarins that a Briton should be appointed Inspector-General of Customs, so long as Britain's China trade maintained supremacy over other countries. Thus the British can wield a tremendous power over the Customs administration. Most of the Commissioners of Customs are also British.

In 1917, customs duties paid by Japanese traders surpassed those paid by the British, but the number of Britons in the service of Customs administration was greater than that of the Japanese. In 1936, the Customs staff numbered 95, of which 51 were British and 14 were Japanese.

Communications

Britain was the first to be interested in railways in China. The first railway under British sponsorship was the Shanghai-Woosung Railway. The construction work began in January 1876. The first mile of the railway was completed in the next month, and the first iron-horse in China, called the "Pioneer," aroused an intense curiosity among the Chinese populace. However, numerous coolies became indignant when they came to suspect that they would lose their jobs if the railway was completed. The Chinese Government ordered the work halted and did not allow further activity until a promise was made that the railway would be sold to the Government at cost. The railway was completed in December, and sold to China in October next year. The Chinese Government then destroyed the railway and threw the locomotive into the Whangpoo River.

The time came, however, when even the die-hard mandarins had to realize the convenience of the railway. They had a bitter experience in 1884, when the Franco-Chinese War broke out. They could not send enough troops to Tongking for want of a railway. In view of the imminent danger of a clash with Japan in Korea, they decided to extend the Kaiping Railway, operated by the mining interests, to Tientsin and Shanhaikwan. The necessary capital was supplied by Britain, in the form of a loan issued by the Hongkong and Shanghai Banking Corporation. This was the first railway loan in China.

After that the Powers competed with each other with avidity, dexterity and shrewdness in acquiring railway concessions, and here, too, Britain was second to none.

Most of the railways which constitute the rail system of present-day China were completed with British investments. These railways are those which run between Peking and Shanhaikwan, Taokowchen and Chinghwachen, Nanking and Shanghai, Shanghai and Hangchow, Nanking and Icheng, and, Canton and Kowloon.

The railways constructed by joint investments of Britain and other countries are the Peking-Paoton, Peking-Hankow, Tientsin-Pukow and Hankow-Canton Railways.

British shipping companies operating in the Chinese waters are numerous. The most important are Messrs. Jardine, Matheson & Co. and Messrs. Butterfield & Swire. In 1938, 39.4 per cent of the total tonnage of the ships plying between Shanghai and the ports along the Yangtze River was British-owned, while 53.5 per cent of the ships navigating along the Chinese coast belonged to British firms.

As Britain is engaged in shipping business to such an extent, it is a matter of course that the best wharves and warehouses belong to the British firms. Those who visit Shanghai, Tientsin and other open ports see the Union Jack everywhere. Even the pilots are mostly British. In 1935, the proportion of the number of Chinese, Japanese, and British pilots was 37 : 7 : 28. In Shanghai, 20 out of 40 pilots were British.

As the postal service was transferred to the Chinese Government from the Maritime Customs, and the foreign post offices in China were abolished in 1923 as a result of the Washington Conference, foreign Powers including Britain have no special rights over the postal administration of China.

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The Conquest of the Tropics

Engineering Problems in South Eastern Asia

By Dr. C. A. MIDDLETON SMITH, M.Sc., M.I.MECH.E., L.L.D. (formerly Taikoo Professor of Engineering) in the University of Hongkong, 1912-39

A TREMENDOUS change in the social structure of the many nations that inhabit the vast continent of Asia is now taking place. If we trace out the origin of the revolutions in social life that have happened in Asia, we find that scientists must receive the credit or the blame for them. Ghandi in India, many of the old conservative officials in China, and in other Asiatic countries, have tried to stem the tide of the new knowledge that is sweeping over the whole world, but in vain. Rapid transport, and other methods of communication, have brought Asiatic countries into the vortex of what is called "Western civilization." The transformation of social life in Asia is the most important feature of world history in this century.

This huge continent was the birthplace of the earliest inventions. The water wheel was used in ancient Babylon; the windmill came from Persia in the eighth century; Algebra came from Arabia; China contributed paper printing, the magnetic needle, spectacles, silk fabrics and gun-powder. The Great Wall and the Grand Canal in China were constructed centuries ago, but they still remain in the minds of engineers, in all countries, outstanding engineering accomplishments.

China first experimented with block printing and moveable type, Japan produced the earliest block prints that are now extant. Koreans first printed type from a metal cast from a mould.

It is difficult to realize how rapid has been the transformation, through the agency of applied science, of the social life of people in Europe and North America. Out of the almost impenetrable chaos of existence in Europe there emerged, by the seventeenth century, the idea of an orderly world. Nature was seen to be no longer inscrutable and subject to demonic incursions from another world. Her forces were to be utilized for the convenience of mankind. The production of power from coal marked the beginning of a new era for mankind. The reason for the diminished use of human beings as prime movers, first in Britain, and then in other lands, was the increase in actual horse-power that was made available to do work.

In the ninth century the invention of an iron horse-shoe increased the range of the horse and gave his hoofs a grip in regions other than grass-land. The harness that allows the shoulder, and not the neck, of the horse to take the pull existed in China in 200 B.C. but it did not come to Britain until the tenth century.

The Revolution Created by Steam

Civilizations are not entirely self-contained organisms. Our present technical equipment has evolved out of the cultures that preceded the age of electricity and alloys. But the invention of the steam engine was the event in history that has had the greatest effect on the human race. Although the internal-combustion engine and the turbine may displace it, the change from one to the other is only a matter of degree of economy. The change wrought by the invention of the steam engine revolutionized all manufactures and all modes of travel. Machinery, actuated by the forces of Nature, but invented by man, then came into being. Because of the astonishing results of his work, and on account of the number and ingenuity of his inventions, James Watt must have a place in the annals of mankind incomparable to anyone else. Probably many men, almost unknown, were as clever. Kelvin was undoubtedly an amazing genius. We cannot compare the relative ability of men like Faraday, Edison, Kelvin, Daimler, and other inventors. It is, however, obvious that the work of Watt was unique in its results. He made possible all over the world the use of coal and oil for power production. Everything material in our modern life, including transport, depends on that.

It is only about 160 years ago that Watt took out the first of his many patents in connection with steam. It was at a period when revolution and bloodshed was being preached as the panacea for the evils of life. Poverty was the main cause of the French

Reign of Terror, as it is of China's chaos to-day. While reformers, inflamed by the sights of suffering, cried "Kill, kill," Watt was working out the beginning of the great economic salvation of mankind. Ignoring those who cried out for blood, he patiently pursued his experiments and studies. A penniless prophet, William Blake, in his wild desire to free the manual workers from their condition of semi-slavery, could sing only of weapons. In his enthusiasm to improve mankind he piped bravely on:—

Bring me my bow of burning gold;
Bring me my arrows of desire;
Bring me my spear; O clouds, unfold;
Bring me my chariot of fire.

Little did he dream that, as if in answer to his cry, Watt was at that time forging a chariot of fire in the precincts of the University of Glasgow. All of Blake's gestures were futile; that ghastly work of the French revolutionaries left a legacy of hate. Watt's work remains immortal. It substituted mental for manual labor.

The migration of modern technics from England to America and to the rest of Europe, and from all these countries in turn to Asia (and Africa) must tend to produce equilibrium in industry and agriculture. No one center is any longer the sole focal point of modern industry. The finest work in cinema photography has been done in Japan; the most astonishing instruments of cheap mass production were to be seen in the Bata Shoe Factories of Czechoslovakia. In thousands of laboratories, in countries all over the world, researches are now being conducted to increase the leisure, health and efficiency of humanity.

Progress Continues

In spite of the anxieties and excitements caused by the recent events in the Far East we, as individuals, must remember our immediate duty and apply our minds to it. We must continue our studies, which, in the case of members of my profession are concerned with utilizing the forces of Nature for the improvement of the general standard of the living for mankind. Others may destroy; the purpose of the engineer is to construct. That purpose has been aided tremendously in recent years by inventions and countless researches carried out in Universities and Commercial laboratories all over the world. Our work and our knowledge is international; it is not restricted to any one race, but it is available to benefit all mankind.

Let us consider some of the problems that await a solution by mankind in general, and by the engineer in particular, in that huge area of undeveloped land that is situated within the tropics. "First, wealth is health" is a statement that should be a slogan for all mankind. Doctors and engineers have accomplished a great transformation in many places in the tropics in recent years. What was formerly jungle is now agricultural land; the old malarial swamp now has healthy inhabitants because engineers have drained it free of breeding places for mosquitoes. Terrific rainstorms formerly caused rivers to overflow their banks, but swollen-rivers have, in recent years, been more efficiently controlled by modern flood prevention measures.

Hongkong presents an object lesson for everyone as an example of what applied science can accomplish. If you read the history of the early days of the Colony you will be appalled by the death-rate. Malaria, plague and infected water took a terrible toll of human life. Those who survived had a low human efficiency value, as is evidenced by the early records. The local population could not have increased from about 5,000 in 1841, to nearly a million in 1937, if great attention, and a considerable amount of public money, had not been devoted to health problems in Hongkong. The Public Health and the Public Works Departments have done an immense amount to make life, not only healthy, but pleasant, in Hongkong. Dr. Patrick Manson (then in Swatow, afterwards in Hongkong and London) discovered that it was a certain type of

mosquito that caused malaria. The obvious thing to do was to make life impossible in habitable regions for that insect. It was shown that, for the life cycle of the mosquito stagnant water was essential. Therefore it was imperative to drain stagnant water in order to exterminate mosquitoes. The origin and cure of many other tropical diseases have also been discovered and thus many old fears of death and sickness have been removed.

Mosquito Control Engineering

An interesting summary was given recently in the *London Engineer* showing an ingenious mechanism for attracting and destroying mosquitoes; it is one phase of the efforts made by engineers to reduce human casualties caused by these insects; that work is of great value to every intelligent person who lives in the tropics. In South China, there are to-day, millions of natives lacking in energy because of the effects of malaria. Throughout the whole of South Eastern Asia the fever persecutes farm workers. The headlines of newspapers record the casualties by warfare, but every year malaria takes a much greater toll of life in Asia than has been recorded in any war.

It is probable that it will be impossible to exterminate the particular type of mosquito that causes malaria, but the records obtained in Hongkong show, beyond cavil, that engineering works can make areas that were known as malaria districts to become entirely free of the danger. When the Shing Mun dam in Hongkong was first under construction the labor force there suffered severely from malaria. The engineers and the doctors set to work: a large number of concrete channels were built to carry away small streams from the hills, so that there were fewer stagnant breeding pools. The hills adjacent to the works and coolie lines were cleared of undergrowth. Oil was spread over stagnant pools and so malaria casualties were greatly reduced. They were not entirely eliminated as the workmen in their spare hours, visited other districts; moreover it was difficult to persuade natives that it is fatal to throw out on the hill-side small receptacles for rain water, such as empty cigarette tins, old felt hats, etc. In Malaya the Government has spent large sums of money in the campaign to reduce malaria. Experience has shown that the expenditure was a splendid investment. There is, perhaps, no large area of land in the tropics which has been more rapidly transformed from conditions dangerous to health into those that aid human efficiency than Malaya.

Modern Buildings in the Tropics

During my residence of twenty-seven years in Hongkong I saw many changes in the style of buildings. Reinforced concrete structures are now standard designs. They have eliminated the dangers caused by white ants, beetles and other tropical insects. In the old houses wooden beams, vulnerable to such pests, and dangerous in case of fire, were a constant cause of anxiety alike to the householder and the architect. The fact that buildings using reinforced concrete are now almost universal, not only for offices, hotels and large structures, but also for private houses in Hongkong, Shanghai and other places in the Far East, reminds us of a noticeable and recent development in architecture in this part of the world. Reinforced concrete is valuable for building bridges in the tropics.

There has now come into use, in a few cases, another remarkable improvement which will, in due course, become universally adopted in the buildings in the tropics which are occupied by those who can afford to pay a little extra for a very great increase in comfort, health and mental efficiency. The head-quarters of the Hongkong and Shanghai Banking Corporation, completed three years ago in Hongkong, is probably the most modern and one of the most costly structures in the Far East. It is remarkable also, because those responsible for its construction have included in it equipment to produce a manufactured atmosphere, comfortable to occupants, in a tropical climate.

The following experiment gives you an idea of the climate in Hongkong. I installed a little machine, of about the size of an electrically driven gramophone, in my small office in the University. During six hours it condensed about a gallon and a quarter of water from the water vapor in the air in the room. That was at the rate of about 2 lb. of water in an hour. The room is about 13-ft. long, 13-ft. wide and 18-ft. high. The machine was priced at about £100. The cost of electric energy used was small, viz, 50 cents for ten hours; about five cents an hour. It was well worth the money. For in place of the depressing moist atmosphere of the tropics, the

air in my room at the end of the six hours was cooler, drier, and indeed quite pleasant. My energy increased and my spirits rose as the moisture was abstracted from the air.

The Value of the Tropics

The human machine always reacts to the varying conditions of the atmosphere. Even as far back as 2,000 years ago a Roman writer made an observation that "Men are very much in disposition and feelings according to the climate of the country they inhabit." The experience of a long residence in Hongkong, with its hot and humid climate in the summer, has made me realize that the health and the enterprise of humans are adversely affected by a tropical climate. That is a fact confirmed by medical records. But air conditioning conquers the enervating effects of a tropical climate.

The vast tropical areas of land are an enormous heritage for profitable development. That will not come about until living conditions are made more healthy in the tropics. If we can be made to feel reasonably energetic, development of the vast natural resources must follow. The tropics cover an enormous area, about one-third of the land surface of the globe. The climatic and economic conditions of the people and lands in the tropics have, in recent years, been carefully studied, mainly in order to obtain an increased supply of raw materials needed by the more highly organized industrial nations. The natural resources of the tropical regions are vast and valuable. They are waiting for energetic and scientifically trained men to utilize them for the benefits of mankind.

Human Energy

Under normal climatic conditions in the tropics the natives, and after a time, Europeans, show very little enterprise, and seem to have very little energy. Human life depends upon industry, but the natives in the tropics have hitherto supported their low scale of living with very little exertion. Nature gave them food almost without cultivation, but the standard of life was low and they were unprotected against floods, famine and disease. Europeans cannot maintain their higher style of living in the tropics unless they develop the natural resources available. They find it difficult to do that mainly because of the enervating effect of a tropical climate. With manufactured weather in offices and homes we are able to regain our energy and enterprise. With these assets we can utilize our scientific knowledge and scheme out plans for installing machinery to develop and generally to utilize the forces of Nature for the benefit of mankind.

Hitherto mankind has not had the will to organize properly and enjoy this great natural storehouse. The tropics abound with elements which are urgently required—foodstuffs, the raw materials of commerce and manufacture, scenery, sports and changing scenes. Yet the native inhabitants have dwelt there in comparatively miserable social conditions. But changes are taking place. It is, in reality, a problem of utilizing scientific knowledge for the economic adaptation of man to his environment. The inhabitants of the tropics who have lagged behind their fellows in more temperate zones in enterprise, have been able to blame the enervating climate for their lethargy and low human efficiency. That excuse can no longer be advanced, for the enervating atmosphere of the tropics can be changed into one that is ideal, by the use of machinery.

Doctors are agreed that health of humans in the tropics may be adversely affected by (a) high atmospheric humidity, (b) great heat (c) strong sunlight (d) excessive dryness of the air, and (e) electrical instability with perhaps (f) continued equable temperature. Of these the greatest enemy to comfort and human efficiency is humidity, i.e., water vapor. Excessive humidity at any atmospheric temperature is unpleasant. If the temperature of the air is well below body temperature, excessive moisture makes us feel very cold. If, on the other hand, the air temperature is high with considerable humidity, the atmosphere makes us feel limp and disinclined for any physical or mental exertion. Acclimatization to extreme air conditions puts a strain on the heat-regulating system of the human mechanism which interferes with the normal physiological functions of the body. Thousands of years of exposure to the extreme heat of the African equatorial regions has not acclimatized the Negro to an average temperature of 80 degrees F: he is limp and listless in the moist heat. Similarly Eskimos feel the cold. The elimination of humidity from the atmosphere by mechanism (air-conditioning) will have a profound affect upon the economic

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A Nisei Visits China

By KAZUMARO UNO

Here is a bit of descriptive writing in the form of a letter from Hangchow, which possesses a measure of novelty in that it is written by a true alien to this part of the world who may be said to present a composite Occidental-Oriental viewpoint. Mr. Kazumaro Uno, the writer, is one of that group of "second generation" Japanese born in the United States that lately has been coming in increasing numbers to the Far East. Mr. Uno was born in California and has attained some distinction as a newspaperman. In San Francisco's newspaper world he is popularly known as "Buddy" Uno. He is accredited to the Japanese Army as a war correspondent and in that capacity is serving a group of newspapers in the United States. This letter from Hangchow is the first of a series.

HANGCHOW, CHINA, Aug. 16—(By mail)—Undoubtedly, at one time or another, you have seen a Chinese masterpiece by a brush artist depicting a serene landscape...remember, sharp jagged hills in the distance, a single pagoda on the hillside piercing the misty sky, a lake with islands connected by series of half-moon bridges, and in the foreground, an aged Chinese sage sitting beside the lake fishing in Tom Sawyer fashion. Such a picture comes to life in Hangchow, the "city by the lake" known for its beautiful West Lake.

I arrived here yesterday from Shanghai on a train. The distance is about a hundred miles; it took four hours and a half to negotiate this distance because of the numerous military outposts where the train stops to discharge mail and supplies. These military outposts are established to guard the railway from destruction by guerilla bands. Save for these outposts, the scenery from the ruins of Chapei to Hangchow is chiefly that of rice paddies. Most amusing sight from the train for me was to see water buffalo beneath a thatched shelter walking slowly round and around, turning a crude wooden wheel that pumps water from a nearby stream to the rice field. Sometimes the water buffalo is being given a rest as several women and boys turn a wheel that is operated by just hanging on to a cross-bar and stepping on a paddle wheel. A very primitive method of irrigation.

The express train consisted of the steam engine, eight third-class cars (one of these for soldiers only), and a single second-class car which was divided into two sections, one for regular passengers and the other for official and semi-official military big shots. I was privileged to ride in the official compartment because of my registration as official war correspondent attached to the army. Nine out of every ten officers on the train were members of the Military Special Service Corps being sent out for reorganization and reconstruction work such as supervising building of roads, planning houses, establishing educational systems, and the like.

Hangchow Initiation

When the train pulled into the station at Hangchow and I followed the crowd out into the station, I was halted by an elderly woman dressed in white who asked me: "Where is your vaccination certificate?" Suddenly it occurred to me that I hadn't it with me. I explained to the woman, who evidently belonged to the Japanese military medical corps, that although I had been properly inoculated against cholera, typhoid fever and small-pox in Kobe, I had forgotten my letter certifying the same in Shanghai. She smiled politely and commanded: "Your arm please." Reluctantly, I obeyed, for it is the only way to get along with the military authorities...argument never wins. She jabbed a hypodermic needle into my arm. For a moment, I felt a pain and it was gone. She filled out a form and handed the paper to me and advised: "Carry this one with you wherever you go, please."

Not knowing anything about Hangchow, I asked a military policeman on duty if he wouldn't recommend a hotel to me. He named two, but specified that the Tsuneoka Hotel is more convenient of the two because it is located right in the main section of the city. And that is why I am now staying at the supposedly the best Japanese hotel in Hangchow. Evidently, from the name carved on the cabinet in my room, this hotel was once known as the Fairyland Hotel. Looking out of the hotel window, I can imagine why the capricious name was chosen for the view is one that gives the observer a wide view of the grandiose landscape or to say the least, a romantic vision of Hangchow. The hotel, by the way, employs no less than fifty of which number more than

half are Japanese girls who are known as "jochyu" or service girls and the remainder are Chinese "boys" or men-servants. The chef in the kitchen is a Chinese who prepares tantalizing dishes to suit both Chinese and Japanese palates. But, alas, for me, his culinary art did not please my taste. Just give me a plain, good, old Hamburger or Coney Island red-hot! The hotel is built strictly according to the Chinese plan, consequently there are no rooms with bath or wash basin, only after the Japanese had taken over the management, a Japanese style bath was constructed on the ground floor, the beds are springless and covered with fancy mosquito nets.

My immediate impression of Hangchow was one of admiration. Peace reigned within the city walls, although I was told that a few miles outside the wall, danger lurked as guerilla bands threatened the life of anyone who dared to venture too far from the city. But the Chinese civilians living secure and under the protection of the military and police of the new Chinese Provisional Government were already quite indifferent to the world outside of Hangchow.

It is difficult for one to imagine the hardships that was endured by the Japanese upon their occupation of Hangchow on December 6, 1937. Not only were they confronted by the problem of saving 450,000 refugees left to die from disease and starvation, but Hangchow is considered the birthplace of Generalissimo Chiang Kai-shek (he was actually born in Honwhoa few miles from Hangchow), center of anti-foreign education. Therefore, after feeding and giving medical aid to the destitute refugees the Japanese military Special Service Corps dealt with anti-Japanese and anti-foreign propaganda and education with a new education based upon Sino-Japanese co-operation and unification of China, Manchoukuo, and Japan in establishing a new order for the East Asiatic peoples. Although people in Manchoukuo and North China readily accepted Japanese plans, the inhabitants of Hangchow were rather indifferent to Japanese overtures, principally, because they were unfamiliar with Japanese. The English penetrated into Hangchow some three hundred years ago, American missionaries began their work among natives of Hangchow about 70 years ago, and it was only in recent years the Japanese began to come to Hangchow. As a result, I was able to get along quite well because the local Chinese spoke more English than Japanese, unlike in North China and Manchoukuo where Japanese is better understood than English. However, it is to be admitted that the people of Hangchow are very clever businessmen. Physically, they are very much like the Japanese, built solid and not very tall, lovers of art and culture, and very religiously inclined.

At present, the people becoming more familiar with the character of the Japanese are less bitter in their feeling toward the "invaders" and their attitude now is "let's make the best of it now." The population has increased steadily and at present there are no less than 800,000 of which number only 1,300 are Japanese and about 40 Occidentals. In other words, Hangchow at present has a population equal to that of Boston, Mass.

Christian Missionary

I chanced to visit an American mission which was established here about 60 years ago by a Miss Edith Bartlett, who also founded the Nagoya College in Nagoya, Japan. I think I got her name right. Anyway, the only person I could find on the compound of this mission was an elderly woman about sixty-five. Her name is Miss A. R. V. Wilson and she hails from the good old south, Richmond, Virginia. When I asked what denomination the mission was under, she replied the First Presbyterian Church of America.

I was glad to hear that because I, myself, am a baptized Presbyterian and I went to Sunday school in Salt Lake City, Utah, the church located on C Avenue was headed by Dr. Davies. We spoke intimately of "our" church. Presently, I asked her if the hostilities had damaged the mission and she replied bitterly that several of the mission buildings located outside of Hangchow had been burnt down and within the buildings were many books that were essential in teaching the gospel to the Chinese. However, she could not say who destroyed the buildings, Chinese or Japanese. Then I asked her if there was anything the Japanese military authorities could do that would enable her to carry on her good work. Her reply was: "I am here to preach the gospel. I don't want to have anything to do with the Japanese military." Her impassive attitude surprised me. I explained admitting the Japanese military had occupied Hangchow. Ever since, they have been devoting time and effort in aiding the refugees by distribution of food, medical care, and even organizing a business-aid bureau to assist down-trodden refugees to return and resume business. Isn't this sort of work more or less what you are trying to do besides giving them spiritual encouragement? I asked. On this, we agreed.

"Are the Japanese interfering with your spiritual mission?" I asked.

"No, but often, I can't go wherever I want to go," she replied.

"Where for instance?"

"I am not allowed to visit my missions which are located several miles outside the city," her pleasing smile was gone.

"And why not, do you know?" I asked with a smile, for I knew the answer.

"It is dangerous," she admitted reluctantly. And I didn't have to explain, but for the sake of clarifying the point, I impressed upon her mind that the Japanese military authorities were only trying to protect her. This, she admitted also, with a slight nod of her head. And a question came to my mind: "Why are so many of our religious leaders so narrow-minded that they cannot see anything but from a religious angle?" For that matter, even military men are more broad-minded than some of these missionaries.

Buddhist Missionary

When the Japanese occupied Hangchow and the work of saving thousands of anxiety-stricken people was faced, a Buddhist priest by the name of Gyokai Kawata was sent to the scene from Nara. With the highest Buddhist education, age only 35, and holding the second highest Japanese wrestling rank, the priest was appointed Abbot *pro tem* of various temples serving large districts and administrator of funds for the purpose of maintaining public services. And what did the Buddhist priest do?

He found in the temples hundreds of Chinese priests who were quite illiterate. They were assiduous only in rattling their useless prayerwheels. Kawata selected one hundred of the most intelligent of them and instructed them in the arts of caring for the sick, relieving the needy, cooking, carpentry, gardening, and agriculture. After only two days, the temple had been transformed into a hive of activity. The gilded temples were filled with beds for the sick, outdoor cooking and provision of alms houses fed 20,000 hungry souls, and soon Kawata had organized means of clothing the naked, established elementary schools, orphan asylums, hospitals, etc., so that the danger of need and starvation might be averted.

In the summer of 1938, foreign newspapermen having heard of Gyokai Kawata and his miraculous fetes, visited the Buddhist priest and when asked how he gained his expert knowledge, he explained: "It is traditional with us that priests should not confine themselves to academic studies but should also be well-grounded in the practical arts of daily life so that they may be the guides and counsellors of the people in all departments of human activities."

Anti-Communists

Not far south of Hangchow are thousands of followers of Wang Ching-wei, the anti-Communist pacifist leader of "New China," who are suffering from lack of food, excess taxation by supposed representatives of the Kuomintang Government, boys and young men being conscripted. These unfortunate people dare not leave their homes for temporary refuge in Japanese occupied areas because their homes will fall before the "scorched earth policy" carried but by Communists. Many refugees have made their way into Hangchow telling tales of persecution suffered by Wang Ching-wei's supporters and how some of them are paying foreigners in

the vicinity for the use of foreign flags to protect their properties from Chinese Communists.

Hangchow at present has an army organized by the New Central China Provisional Government which numbers more than 30,000 while a student corps now under training is nearly 70,000 and police within the city alone number no less than 5,000. Schools are rapidly increasing in number as already the city grammar schools have 18,000 students enrolled.

To-day, I wandered around town with ten Chinese dollars in my pocket and less than two hours later, I returned to the hotel with the following in my possession: two beautiful oval shaped genuine jades just the right size to make cuff-buttons, two belt buckles carved out of solid marble, large hand-painted Chinese fan, and fancy Chinese writing paper. Do you believe me, all this for 90 cents in American money according to present rate of exchange. In other words, U.S. \$100 is worth 1,650 Chinese dollars. No wonder the U.S. marines in Shanghai are having the time of their life in Chinese cabarets and night clubs . . . spending Chinese money as if it grew on trees.

I'm returning to Shanghai by train in the morning. I'll be leaving Hangchow reluctantly, for not only has the scenery of Hangchow touched my fancy, but also the friendly co-operation existing between the Chinese and Japanese civilians. I am encouraged as to the final outcome of the unfortunate Sino-Japanese conflict. And too, I place Hangchow on my list of recommendation for visitors to China. Hangchow is a "must see" city of fabulous beauty and tranquil peace.

In closing this letter from Hangchow, I'm inspired to quote Lewis W. Bush, American friend of the Japanese, who writes of Hangchow: "Whatever one may hear to the contrary, my experience at Hangchow proved that the Japanese military are energetically caring for the Chinese population and this can be verified by the reports of American and other foreign missionaries in the areas under Japanese control who affirm that the Japanese have done everything in their power to co-operate with them in assisting to feed, attend to the sick, and house those who had fled from their homes."

British Interests in China

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Finance

Apart from the influence of the Customs administration of China, Britain has some claim over the salt tax and the Kuomintang Government employs British subjects in the Salt Gabelle Office.

This is negligible, however, if compared with the vast amount of Britain's financial interests in China. Needless to say, the financial activities of Britain in China date back to the time of the Opium War. The Banks established in succession after the Opium War formed the nucleus of Britain's economic activities in China, and were influential in orientating the Far Eastern Policy of London.

The Oriental Banking Corporation (now closed) was established in 1845. The Chartered Bank of India, Australia and China opened in 1853, the Hongkong & Shanghai Banking Corporation in 1864, and the Mercantile Bank of India in 1858. Of these, the most powerful is the Hongkong & Shanghai Banking Corporation. This bank issued most of the loans on behalf of the Chinese Government. In about 1898, the bank severed its relations with the syndicate of German banks which used to co-operate in the construction of railways in China, and created a British syndicate called "British and Chinese Corporation."

On November 3, 1935, the Finance Ministry of the Kuomintang Government issued an ordinance and proclaimed the reorganization of the currency system, whereby the multifarious bank-notes then in circulation were unified, and the banks of issue were limited to four Government banks. It is well known that Sir Frederick Leith-Ross was dispatched from Britain to render assistance and advice to the Chinese Government. On November 4, Britain issued an Order in Council, prohibiting its nationals in China to pay in silver bullion or to deal in other currencies than the new Chinese national currency (fapi).

British loans and credits to China are too numerous to mention separately. On July 1, 1937, 40.9 per cent (Yuan 673,200,000) of the total amount of the loans to the Kuomintang Government were held by the British, Japan 11.1 per cent (Yuan 182,000,000) and the United States 9.4 per cent (Yuan 153,800,000).—H.M.

Peace with Honor

By WANG CHING-WEI

Wang Ching-wei, erstwhile second in authority in the Chinese National Government, continues to be the single Chinese force of any consequence actively seeking to bring an end to hostilities and restore peace to an almost prostrate China. To this end he advocates, not surrender nor submission to the invading Japanese, but steps that may bring an end to the far-flung destruction, an honorable peace in which the administrative integrity of his country will be retained, and which ultimately will lead to the withdrawal from Chinese soil of the Japanese armed forces. For this action, which this former associate of Dr. Sun Yat-sen has taken boldly, he has been expelled from the Kuomintang and cast into outer darkness by the Communist-Fascist regime at Chungking. Evidence exists that a growing element of conservative Chinese who have at heart the best interests of the Chinese masses and who distrust Russian communism is finding increasing reason to heed the counsel of Wang Ching-wei. In any case his past record entitles him to a hearing. Below is given a translation of his latest public utterance, a radio broadcast that he issued from Canton on August 9.

IT is from the historic city of Canton that I am delivering this broadcast speech to you. Although I am unable to see you my soul has always been with you, and being amongst you now, I am overwhelmed with emotion and enthusiasm.

In my Address of July 9 on "Sino-Japanese Relations: My Conceptions and Aims," I omitted to mention where I made this speech. Subsequently it was alleged that, being in occupied territory, I must have lost my freedom of opinion and of action. Now, I wish to make it clear that after I issued my Peace Proposals of December 29, 1938, I did remain in Hanoi hoping that Chiang Kai-shek could be induced to accept my proposals for the sake of the country. It was only when, after waiting several months, I realized that my hope was in vain that I started to take action myself in order that China may be saved in time. But it is obvious that I am under no obligation to inform the Blue Shirt Society of my whereabouts, and for this reason I must keep my movements secret. This holds good for the past as well as for the future.

Coming back to the point at issue, why should I not go to the occupied areas? In time of war, an individual can stay either at the front, in the rear, in the occupied areas, or in foreign countries. Two additional places are available for the Chinese, namely, the foreign concessions such as Shanghai and Tientsin, and the foreign colonies such as Hanoi and Hongkong. I harbor no contempt for those compatriots who live in such places of safety, provided their aims and activities are directed to serve the interest of their fellow-citizens at the front, in the rear, and the occupied areas. But should they abuse the foreign protection and their immunity from the dangers of war to make irresponsible and libellous utterances, then I cannot help despising them.

What is now really in the minds of the people at the front and in the rear? Should there be no hope of an honorable peace and no alternative but total national extinction, then it would not serve any useful purpose to say anything more about it. But should there be any real hope of an honorable peace, a peace on terms which do not infringe on the freedom and independence of the country, then why should we not discuss the advisability of peace? But the oppressive, dictatorial regime of Chiang Kai-shek and the Communist Party ordered the advocates of Peace to be condemned as "traitors," and the ordinary citizen, silenced, has no alternative at present but to submit to oppression and repression until death liberates him. Therefore, is it not our duty to exert all our efforts to emancipate the oppressed people both at the front and in the rear?

But what about the people in the occupied areas? Their spirit as well as their bodies are inseparable from those at the front and in the rear: we all must live and die together. So should there be no hope of an honorable peace and no alternative but total national extinction, there is nothing more to say. But should there be any hope of a peace on honorable terms, safeguarding the existence of the nation, they will, as true patriots, work with all their energy for the realization of such a peace.

Let us take the case of Canton. Until October last year, the Cantonese people were repeatedly assured by both the civil and military authorities that the Japanese troops would never be able to come and take the city. And up to the first ten days of the month the main function of the authorities seemed, judging from their irresponsible optimism, just to lull the populace into a false

sense of security. No sooner, however, were the Japanese troops approaching Canton than they all fled at the head of their soldiers and left behind the citizens who, deserted, were without any protection whatsoever. And while fleeing before the approaching Japanese troops, they set fire, for no reason whatsoever, to the houses and belongings of the citizens they were deserting. But this was only the beginning of the unnecessary sufferings of the people of Canton. For hating to see anyone surviving their brutal cowardice, they instigated daily acts of incendiarism and robbery, utilizing the common bandits whom they dubbed "guerillas."

Why did the Canton authorities act in such a way? They were simply obeying the orders of Chiang Kai-shek. Why did Chiang Kai-shek act in such a way? He was merely following the commandments of the Communist Party. But do these haphazard sacrifices and unnecessary sufferings serve any useful purpose? Incendiarism by the deserters did not halt the advance of the Japanese troops, nor in any way embarrass their positions. It merely destroyed the lives, properties and the livelihood of the Cantonese people themselves. Apart from this, has it any other sense?

The burning of Canton was not enough. There was the attempt to set Wuhan on fire. A similar order was issued prior to the flight of the authorities responsible for the defence of the city. But due to the natural reluctance of those entrusted with the execution of the order, the unnecessary destruction was not so serious. Thus they burnt Changsha before even one Japanese soldier approached the city. Chungking and Chengtu are now marked to share the same fate. And in addition to these incendiary enterprises on a large scale, there are innumerable smaller ones throughout the countryside, threatening to reduce the whole country into one gigantic graveyard. Therefore should there be any chance of a peace the terms of which will put an end to this unnecessary suffering as well as safeguard the freedom and independence of the country, why should we persist in a policy that is meaningless and suicidal? But the voice of the people at the front and in the rear is stifled and has no means of making itself heard. In the occupied areas, however, the people's cries can be heard, and it was in response to those cries that I came, with the idea of linking up the suppressed people at the front and in the rear and the people in the occupied areas in a common voice and action.

This being the case, is one justified to infer just from my voluntary presence in the occupied areas that I have lost my freedom of action. As a matter of fact, there has been no limitation whatsoever on my liberty and freedom from the side of Japan. Since I decided to come to the occupied areas on my own volition, how can one accuse me of being ignorant of the saying, "The army may lose its commander, but an individual must not lose his volition." I for one would rather die than give up my liberty and freedom. I have always been prepared to sacrifice for the sake of saving the lives and liberties of my compatriots.

The question now is how to realize the peace. It seems a very complicated task, but actually it is quite simple, provided Chiang Kai-shek thinks less of his personal interests and more of the welfare of the people and the country, and further obeys the instructions of the Party Leader on the question of the Pan-Asiatic ideal. Should he obey Dr. Sun's injunctions and accept Japan's Peace Proposals, then an armistice throughout the country can be immediately effected, to be followed by peace negotiations at which outstanding

questions relating to the policy of Good Neighborliness, anti-Communist collaboration, and economic co-operation will be discussed in detail with a view to obtaining a concrete and rational solution and settlement. In this way, the withdrawal of the Japanese troops, so much desired by the whole country, will naturally and certainly be effected. Is it not a simple matter?

But Chiang Kai-shek regards his own personal interests as far more important than the interests of the nation and would rather make a present of the country to the Communist Party and the Third International as a reward for being allowed to keep his life during the Sian Incident. He knows full well that an honorable peace is desirable and at hand; yet, he is bitterly opposed to it, disregarding all consequences to the nation, and forming the greatest obstacle to the speedy realization of an honorable peace.

To overcome this obstacle, however, is also very simple, provided the civil authorities and military commanders at the front and in the rear realize that it is not only desirable but also possible to obtain an honorable peace on terms not detrimental to the national existence and independence, co-operate in counteracting Chiang Kai-shek's vicious propaganda, and free themselves from his oppression. The first step is to declare themselves openly for peace and, in the territories under their control, clear up all communistic conspiracies and abuses, maintain peace and order, and protect the safety, freedom, and properties of the people. The second step is to unite all those in favor of peace and openly demand that Chiang Kai-shek serve the supreme interest of the nation and refrain from obstructing the course of peace. In this way, peace will come to the whole country within a very short period of time. Once peace is realized, the nation's independence and freedom is automatically restored and the foundations of co-existence and mutual prosperity and progress laid. This is the only way leading to China's rehabilitation and to the renaissance of East Asia.

Some one may raise the point that our manifestation of the desire for peace may not prevent the Japanese army from further advancing, which would not only make peace impossible, but would also destroy the morale of our army and the spirit of our people. Is this not too great a risk to take? At this place, I can now solemnly and categorically state that should any civil authority or military commander at the front and in the rear publicly declare their approval and support of peace and their opposition to communism, the Japanese troops will refrain from any further offensive. The Japanese Government has on previous occasions publicly declared that Japan earnestly hopes that far-sighted Chinese citizens should take the lead in rectifying the situation to enable the rehabilitation of China and share the responsibility for the renaissance of East Asia. Therefore the Japanese army will certainly and decidedly refrain from attacking those armies and areas which are anti-Communist and in favor of peace.

Now, in Canton, I have had talks with General Ando, who is in supreme command of the Japanese troops, on the question of the restoration of peace. As a result of a frank and earnest exchange of views I am satisfied that should the Chinese army in Kwangtung support the peace and anti-Communist policies, Commander-in-Chief Ando will, on his part, give the most sympathetic consideration to put into effect the following, namely, the Japanese army will not only stop hostilities against such Chinese troops, but will also take the further step of restoring progressively to China the functions of maintaining public order and safety, of garrisoning the area, the machinery of civil administration, and all matters relating to economic affairs, in the areas now occupied by the Japanese troops. Thus I am in a position publicly to pledge that should the civil authorities and the armies in Kwangtung openly support my peace proposals, I am able to get Commander-in-Chief Ando to agree to an armistice in Kwangtung. And no doubt, similar regional armistices, can be arranged in other parts of the country, so that in this way peace will be progressively restored all over China.

Speaking particularly to the citizens of Canton, I am in a position to say that within the immediate future Canton will be given back to the Cantonese, on whom it devolves to make the city more orderly, more peaceful, and more prosperous than it was before October of last year.

Fellow-countrymen, I hope that my broadcast speech will convince you that peace is realizable on terms which are not detrimental to the nation's independence and freedom. This is not a dream, for sooner or later it will be substantiated by facts.

Citizens of Canton, you are now in an occupied area. Before, you have done your duty at the front and in the rear. You have suffered and sacrificed a great deal. When Chiang Kai-shek

deserted you and left you behind unprotected, he added insult to injury by calling you all kinds of bad names in an attempt to find legal basis for his policy of incendiarism and driving you out on the road to starvation and death. Chiang Kai-shek does not really regard Japan as the enemy, but the uncorrupted Republic of China and the true citizens of the Republic. He is to-day the only obstacle to peace and prosperity. It is for you to remove this obstacle so as to enable you to regain your self-respect and the respect of the world, and once again become the pillars of the renaissance of China as well as of East Asia.

Fellow-countrymen, I know that after the delivery of this speech Chiang Kai-shek will force the civil and military authorities at the front and in the rear to issue another joint declaration against me. But I also know that it will have no effect on the march of events. For if the terms of the peace are such as not to hinder our national existence, independence and freedom, and can be made the basis of national recovery and renaissance, no one can obstruct its realization.

The Conquest of the Tropics

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development of the immense natural resources of the huge tropical areas of South Eastern Asia.

The Demand for Raw Materials

During recent months the writer has been visiting, and studying, economic conditions in the Philippine Islands in Indo-China, Malaya, and Java. In all of the lands the engineer has been at work, building roads, improving harbors, making airports, introducing inventions that have transferred labor from the aching shoulders of men on to the iron backs of machinery, and, in general, raising the standard of life of the inhabitants of those lands. In South-east China considerable progress has been made by engineers since about 1927.

As scientists we are not concerned with politics, although we are frequently hampered by the struggles made by politicians in many countries to secure power. But we cannot fail to recognize the astonishing work that has been done in China, this century, by foreign and Chinese engineers in extending communications and in the regulation of inland waterways. It is probable that the rapid construction of the road from the Burma frontier to Kunming, over the most difficult route in the world, will be considered one of the remarkable engineering accomplishments of this decade.

A study of economic conditions in the countries recently visited in South-east Asia, a long experience of the ability of Chinese engineers, and a consideration of the vast natural resources in those large islands that lie between Malaya and Australia, all make the writer believe that when peace returns to the Far East there will be a very great and rapid transformation in many of those tropical areas. There will be a very great demand for engineers.

It seems to many scientists that, even to-day, mankind has not realized that, because of the new knowledge available, and the huge areas in the tropics that can be made productive, the standard of life in Asia can be immensely improved. The most urgent need is to attract the intellectuals of Asiatic countries to adopt engineering as a profession. The most obvious method of doing so is for Governments to offer to engineers in their employ salaries that are at least equal to those paid to officials in administrative works. Hitherto, Government engineers have, as a general rule, all over the world, been badly rewarded when their long and expensive training is taken into consideration, as well as the importance of their work to the community. Especially imperative is it to provide attractive salaries for engineers working in tropical lands.

It is certain that many of the raw materials needed by industrial nations can be supplied from those areas. There are almost inexhaustible forests, and as these are cleared the soil is usually found to be rich and productive. Nobody can estimate the probability of mineral wealth that is available. But as the forest land and the jungle is made productive, communications will spread and commerce must extend to all parts of the world.

The conquest of the tropics is the most fascinating work in which the engineer can play a part in the next few decades. He will be stimulated to great exertions by the knowledge that, as a result of his work, he will be helping to raise the standard of life in these tropical countries.

Industrial Program of Japan and the Yen-Bloc Countries

By DONALD W. SMITH, Assistant Commercial Attache, Tokyo

THE Japanese Cabinet Planning Board recently released a brief statement regarding its three year program for the expansion of production of essential basic commodities in Japan, Manchuria, and North China. It is hoped that the program will bring about a sufficient degree of self-sufficiency in iron and steel materials, non-ferrous metals, gasoline and heavy oils, chemicals, pulp, machine tools, rolling stock, motor vehicles, and wool by the spring of 1942 to enable the yen-bloc countries to be independent of foreign sources of supply for these commodities.

Increased gold production, and stimulation of the exports of agricultural products from Manchuria to obtain foreign exchange for the purchase of the equipment required for the industrial expansion program, are also part of the plan. Whether the newly developed resources of the yen-bloc countries, supplemented by Japan's own undeveloped resources, will lead to the degree of self-sufficiency desired within the short space of three years depends to a considerable degree on the availability of capital and labor, according to the report.

General Industrial Expansion Program

The Cabinet's Planning Board did not mention specific quantity goals to be attained by 1942, but merely planned percentage increases over the present production capacity. The planned increases in production of some of the leading basic commodities in Japan, Manchuria, and North China are indicated in the following table:

Commodity	Planned percentage increase	1936 production in Japan	Per cent of production to 1936 demand
		Metric tons	
Ordinary steel ..	60	4,264,253	—
Special steels ..	100	75,813	91.6
Steel ingots ..	60	5,223,017	—
Pig iron ..	100	2,007,500	64.6
Iron ore ..	150	863,200	12.5
Coal ..	30	41,000,000	89.2
Copper ..	80	78,614	61.7
Lead ..	About 90	8,883	8.0
Zinc ..	About 70	36,066	37.0
Tin ..	100	2,200	28.8
		Cases	
Heavy oil, natural ..	40	3,659,000	30.0
		Metric tons	
Pulp for paper ..	20	747,356	82.0
Pulp for rayon ..	220	55,209	39.0
		Units	
Automobiles ..	400	*3,500	15.0
Machine tools ..	100+	Unknown	—
Wool ..	240	None	0

*Estimated.

Japan's Share in Program

The only indication of the extent to which Japan itself is expected to contribute to the general success of the plan is given by the various official measures that have been introduced to provide for the financing of the emergency industrial developments,



A busy street in Osaka

to encourage the production of specific commodities, and for the mobilization of materials and labor.

Aside from the introduction of various control and encouragement measures, the Government is also actively participating in the industrial expansion program by the expenditure of considerable funds. Among the many measures adopted is the National General Mobilization Law of May 5, 1938, and the Material Mobilization Plan of June 23, 1938. The former measure provides for virtual State control over the commodity and personal resources of Japan. While all the articles of the National General Mobilization Act have not been invoked, those providing for control of school graduates, registration of vocational ability of the medical profession, control of wages, restriction of working hours, training of technicians, restriction of employment of workers, and restriction of dividends of corporations capitalized at Y200,000 or over, have been enforced.

Japanese Labor Supply and Problem

The industrial expansion program which is planned for the yen-bloc countries is said to be largely dependent on Japan for a supply of skilled and trained labor. However, Japan at present is not able to supply its own requirements. Because of the increasing number of men summoned to the colors, as well as the increased activity in the munitions and allied industries and the speed with which they have been expanding, the labor market is not only feeling an acute shortage of technicians and skilled workers but carpenters, plasterers, gardeners, etc., are likewise difficult to obtain, according to an article in the *Oriental Economist*. Steps are being taken, however, to mobilize all available labor resources and to train technical workers to cope with the increasing demand for additional manpower.

Industrial Development of Manchuria

Early in 1937 it was announced that Manchuria would endeavor to push a five year plan of industrial expansion, particular attention being given to the production of basic commodities in which Japan was deficient. The former principle of the dependence on Japan for basic commodities was abandoned, and a new policy was outlined providing for Manchurian self-sufficiency in certain lines. In 1938 the plan was revised to cope with the increased demand for basic commodities following the outbreak of the China incident, and the goal set for total production of a number of essential products was practically doubled. Under the revised

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Britain's Move to Adjust War Debt

By JOSEPH DRISCOLL in *The New York Herald-Tribune*

WASHINGTON, May 6.—Settlement of the astronomical British war debt to the United States is expected to be undertaken this Summer to improve relations between the two countries and to oil the London-Washington axis, which can never function perfectly as long as this old trouble exists.

On June 15—exactly a week after King George VI and Queen Elizabeth are scheduled to dine at the White House with President Roosevelt, Mrs. Roosevelt and the "first fifty" families of Washington—a semi-annual installment of the war debts will fall due. If they follow the precedent of recent years, Britain and the other defaulting nations of Europe will send polite little notes to the United States saying they are still unable to pay and they are so sorry. However, there are indications that Britain will attempt to shatter this one precedent during 1939—if not on June 15, then on December 15.

New Envoy Wants Deal

Even if the prospects of another world war keep the King and Queen away from the White House, the need for debt settlement will remain; indeed, it will become all the more urgent for the British. No one knows this better than Philip Kerr, Marquess of Lothian, who this Summer will succeed Sir Ronald Lindsay as British Ambassador.

Prime Minister Neville Chamberlain and his new envoy to Washington are "Neville" and "Philip" to each other, and it is quite likely that Philip already has converted Neville to his way of thinking about the debt, which is that the sooner it is settled the better it will be for hands-across-the-sea.

Mr. Chamberlain, in the years when he was Chancellor of the Exchequer, managed to balance his budgets by the expedient, among other things, of making no provision for the debt owed to America. When opposition critics accused the Chancellor of repudiating the debt, he was defended by his half brother, the late Sir Austen Chamberlain, who argued that the debt had not been repudiated; it merely had not been paid.

New Esteem for U.S.

Nowadays Britain finds it less advisable to balance her budget in that way. As a matter of fact her huge defense loans render any balanced budget little more than a neat trick on paper. Spending billions for battleships and warplanes, Britain figures she might as well spend something more to recover America as an ally in war time. This change of opinion is reflected in certain English papers which used to blackguard Uncle Sam as "Uncle Shylock," but now hail the bewhiskered old gentleman as the potential savior of the "three great democracies."

As Britain gingerly prepares to pay something on account, say ten cents on the dollar, American public opinion appears to be changing, shying from any settlement of the first World War debt

which would place the United States in a position where it would finance the second World War. At present the Johnson act prevents lending to defaulting nations. By arranging a settlement, Britain would escape from the straitjacket of the Johnson act and go to the head of the line of borrowers for the next war.

Capitol Can't Agree

Among Congressmen there are at least three schools of thought on this subject. One school demands in every Fourth of July speech, and more often too, that the European defaulters should pay in full and with interest. An opposing school wishes to accept a nominal sum and wipe the slate clean. A third school desires no settlement at all in order that the Johnson act may remain in effect and forestall further loans. To them the Johnson act is cheap credit insurance.

That the debt issue is very much alive at this moment cannot be denied. There was a curious demonstration of this at the recent Gridiron dinner attended by President Roosevelt and hundreds of the nation's celebrities. When European diplomats were called upon to take a bow, there was mild applause for most and a wild ovation for the Finnish Minister. Why? Finland is one nation paying its war debt to Washington.

Noting the popularity of Finland, Rumania this week applied to the State Department for immediate negotiations to bring about a reduction so that Rumania might resume payments on her \$64,000,000 indebtedness. As war debts go, this is small, but Rumania's move is important in that if she manages to settle for ten cents or 50 cents on the dollar, or on the original principal minus interest, she will be setting a precedent by which Britain, France, Italy and the other defaulters can apply for the same terms.

Directly or indirectly, Britain and the others will be interested in the outcome of Rumania's application just as they were interested a year ago when Hungary sought to liquidate its \$1,939,000 debt by repaying the principal, without interest over thirty years. The State and Treasury Departments favored the Hungarian plan, but Congress pigeonholed it.

What Congress will do on any Rumanian proposal it gets remains to be seen, but Senator Homer T. Bone and Representative Martin Sweeney shot in a few advance words this week. The Senator suggested that Britain should pay her debt to America instead of paying royalties to Germany on Czech machine-gun patents. And the Representative suggested that the King and Queen should stroll over from the White House to the Treasury building and make at least a down payment on the British war debt of \$5,419,388,374.72. Showing what a long memory about debts certain Congressmen have, the Representative proposed, as an addition to the royal entertainment program:

"One evening bonfires might be lighted on Capitol Hill and on the White House grounds, lest they forget August 24, 1814, when the British burned the Capitol and the White House."

Oil Controversy in "Thai"

Tokyo, August 14.—With a breakdown in the negotiations between the Government and foreign oil companies over the enforcement of a fuel oil control law, the petroleum problem in Thai (Siam) is assuming serious proportions, the *Japan Times* reported in a special Bangkok dispatch.

A shortage of oil products is being felt in certain parts of Siam as a result of the suspension of distribution activities by the Asiatic Petroleum Company and the Standard Oil Company, the report said. All agencies concerned have been mobilized by the Thai Government to combat this situation and to attain a smooth distribution of oil, according to the dispatch.

Anti-profiteering measures have also been enforced by the Government which is being backed by the people who see in the

dispute a test on the complete restoration of national rights by the Thai nation.

British and American oil interests are being bitterly criticized for their failure to comply with the laws of the country in which they are doing business, the Bangkok report continued.

A movement to halt the operation of all motor vehicles and vessels for one day so as to contribute the amount thus saved to the Government is also afoot but the agitation against the oil firms is being strictly controlled by the Government which fears serious outbreaks, the dispatch said.

The dispute according to the report, has given fresh impetus to the nationalist movement in Thai.

China's Great Task in the West

Here is a report written by an outstanding Chinese writer and traveller reviewing immense projects planned and being carried forward by the Chinese Government in the far western provinces along the country's boundaries. It is to be remembered that the historical record discloses that the Chinese ever have been prone to "draw lines on a map," and an experience not uncommon in the progress of the Nation is the published announcements of the completion of vast projects that have not got beyond the stage of blue print plans. This writer may have been carried away by his enthusiasm in certain details, but he offers evidence nevertheless that an immense amount of real work and progress is taking place in China's hinterland.

* * *

A CONCRETE example of China's growing industrialization in the South-west is given by the increasing number of government and private factories in the provinces of Szechuen, Yunnan, Kweichow and Sikang.

Between October, 1938, and March, 1939, no less than 12 big factories with a total capitalization of tens of millions of dollars have been erected by government organs while a number of others will shortly make their appearances in the hitherto little exploited South-west which is exceptionally rich in resources and raw materials. Additionally, South-west China is the new home of at least 300 factories and workshops removed from the seaboard and Central China provinces.

For centuries these provinces in the remote interior enjoyed peace and quietude. To-day this traditional tranquility has been invaded by the roaring of machines and hustle of workers. In Szechuen in particular is this movement especially noticeable where several notable additions have been made in the factory-building program of the nation. Heading the list of the already-established factories in the hinterland province are some of the Government-owned hydraulic plants in west and east Szechuen, arsenals, gasoline and alcohol plants and other war industries. Of the privately-owned manufacturing plants, the Chungking Iron Corporation situated not far from China's wartime capital and the \$4,000,000 Szechuen Sericulture Company, a joint enterprise of the Ministry of Economics and the provincial authorities, are the largest.

Under construction are a semi-official sugar refinery to be capitalized at \$3,000,000, a Szechuen-Sikang woollen mill with an initial capital of \$300,000, a cotton mill for the manufacture of high-quality suit materials and an alcohol distillery plant for the production of more alcohol and synthetic gasoline.

The industrial boom in the frontier province of Yunnan is concentrated in mine work. The Northern Yunnan Mining Administration, organized by the National Resources Commission of the Ministry of Economics and the provincial government, has already introduced modern mining and refining methods to increase copper production in the largest producing center of that metal in China. Meanwhile, the Administration is constructing a water and power plant in the province which, when completed in two years, will supply electricity to every district in Yunnan. This wide program of electrifying the whole Yunnan Province will cost \$6,000,000.

Scientific production of tin and lead, for which Yunnan is famous, is also being applied in those mines, where, only a few months ago, production was carried out by centuries-old methods. It is expected that the mining industry in this frontier province will greatly prosper with the formation in the near future of a development company to be backed by \$50,000,000 from Chinese residents in the South Seas. The leading figure in promoting this scheme is Mr. Aw Boom-how, China's industrial magnate in the Straits Settlements.

The Hsin Hwa Chemical Works, organized by many Shanghai and Canton industrialists in Kunming, is already manufacturing huge supplies of chemical articles from native materials; while the \$1,250,000-cotton mill of the Yunnan Provincial Economic Commission is now marketing its fine and inexpensive cloths and yarn over a wide area.

Government efforts to develop Kweichow Province—another part of the southwestern bloc—are mainly directed along the lines

of exploiting its rich mines. Of the four chief mercury districts in China, Kweichow possesses three while the fourth, is in western Hunan Province. A total of \$400,000 will be invested in increasing the output of mercury in Kweichow while another \$200,000 will be used for improving marketing and transportation facilities. The whole industry will be under the direction of the Kweichow Mining Administration, organized by the provincial government with financial and technical co-operation from the National Resources Commission. In March the head of the provincial government's prospecting party in Kweichow reported that 8 oz. of gold had been won from crushing a specimen ton of quartz. Though this sounds a fantastic figure, it must be remembered that gold has always been found in large quantities in the province by the primitive sand-washing methods of the natives and that until recently no systematic attempts had been made to locate the mother lodes.

The wave of industrialization is also sweeping China's newly-established "Baby" province of Sikang into action. Rich in gold, Sikang is attracting many enterprising Chinese industrialists to a "gold rush." The Government-organized Gold Mining Administration has already selected a district in east Sikang as its main center for extracting that precious metal. A mill for the manufacturing of goods from the famous Sikang wool has already started operations. Meanwhile possibilities for exploiting the rich coal mines in that frontier province has been studied. The Kiayang Coal Mining Corporation under the Ministry of Economics may before long have the privilege of using the machinery from the famous Hsiangtan coal producing regions in Hunan Province where the proximity to the war zone makes continued operations inadvisable.

Industrial Development in Shensi

Three cotton mills, three flour mills, two dyeing factories, two machine shops, a match factory and a cotton and gauze factory have been established in and around one of the south-west Shensi cities since the outbreak of Sino-Japanese hostilities, according to an official of the Industrial and Mining Adjustment Administration who returned to Chungking last week after eight months' work in this Shensi city.

The three cotton mills, two of which were moved to Shensi from Shanghai, are expected to increase the number of their spindles within two months to a total of 20,000.

The three flour mills, according to the official, are turning out a total of 5,000 bags of flour monthly, which greatly helps in augmenting the supply of foodstuffs for the army.

Government assistance to these factories has assumed various forms, one of which is the supply of raw materials at a low cost. A factory has been established by the Government for the development of a coal mine about 50 kilometers north of the city, while preparations are being made for the development of two additional coal mines in the province.

As a result of Government encouragement, Shensi is producing 1,000,000 piculs of improved cotton annually.

Preparations have been made in Shensi for the manufacture of petroleum from oil extracted from cotton seed, and alcohol from kaoliang, a Chinese wine. A group of scientists and engineers has been sent to the province by the Government to assist in the construction of a petroleum plant and an alcohol distilling plant.

The authorities are making efforts for the improvement of the production of fur in the north-west. Similar attention is being paid to the production of wax and tung oil.

For the improvement and transportation of Shensi products, the provincial Government set aside \$2,000,000 six months ago. The work is being handled by a special government body. To co-ordinate production and consumption, it has been buying and selling local products on the open market whenever such procedure has been found necessary.

To supplement existing transportation facilities, the authorities have mobilized between 600 and 700 hand-carts for the conveyance of Shensi's products. In order to minimize expenses, Shensi's cotton will be transported to Szechuen largely by this type of vehicle.

Stimulated by Governmental encouragement, co-operative enterprises are thriving in this province. Co-operative societies have been organized and popularized by the Provincial Co-operative Bureau, the Farmers' Bank, the Provincial Cotton Improvement Bureau, the Bank of China, the Shanghai Commercial and Savings Bank and the Bank of Communications. Not long ago industrial co-operatives were introduced to the province and now give every sign of having taken firm root. Large numbers of co-operatives are extracting coal and mining gold. A co-operative society has also been established for the manufacture of alcohol, and another one for the repair of machines.

Yunnan to Double Tin Industry

Among the tin-producing centers of the world, Yunnan Province in China's great South-west occupies a definite place. It produces between 8,000 and 9,000 tons of tin annually, which is more than 90 per cent of the nation's total production and is valued at \$18,000,000. More than 50,000 of Yunnan's population are dependent on this for their livelihood for this reason. Yunnan's tin industry is often spoken of as her economic life-line.

The United States and Great Britain, the world's greatest markets for tin, import their tin chiefly from the Dutch East Indies, Bolivia, the Malay States and China.

Although China produces a considerable amount of tin, she has to import about 40,000 tons of tinplate annually (sheet iron or steel coated with an alloy composed approximately of four parts lead and one part tin), from the United States and England. This is chiefly because China's iron and steel industry has not been fully developed.

In line with the nation's determination to exploit resources, the Northern Yunnan Mining Administration, organized by the National Resources Commission and the provincial government, has recently introduced modern excavating and refining methods, whereby the annual tin production will be doubled. When this plan is carried out, the value of the tin output will be increased from \$18,000,000 to \$26,000,000 or more, and the number of workers from 50,000 to 100,000.

China, ranking fifth as a tin producing center, is not a member of the International Tin Committee, which was organized in 1931 by the Straits Settlement, the Netherlands East Indies, Bolivia and Nigeria in an attempt to control the annual tin production of the world. It is the belief of mining experts that China, during her period of tin output expansion, should not be a member of the committee.

Yunnan's tin deposits are found in Kochiu, in the southern part of the province, about 20 miles west of Mengtze district. Until 1932 the excavation work was done by native methods, and the ore was shipped to Hongkong for smelting and purification.

In 1932 there was organized the Kochiu Tin Smelting Company. This organization, capitalized at \$2,500,000 operates a modern smelting plant in the mining district itself. Its equipment includes two 12-ton reverberatory furnaces and one six-ton purifying furnace. With this modern equipment, tin can be produced of a 99.8 per cent metallic content.

Szechuen's Iron and Steel

The war has deprived China of many of her iron and steel mills in the northern and central province. But such losses, according to officials of the Ministry of Economics, have not been a mortal blow to China's heavy industries. In the hinterland the nation's resources have already been mobilized to start another iron and steel manufacturing center to be equipped with the machinery saved from the hands of the Japanese in the different parts of the country.

From Hanyang, where the famous Hanyehping Iron Works were formerly located some of the nation's largest machines, including two 100-ton and two 250-ton blast furnaces and two 30-ton Martin furnaces, have been removed into the interior. Although actual production from those furnaces has not yet begun, preparations are being vigorously pushed under the direction of the Ministries of War Economics to help this huge plant resume operation with the least possible delay. Meanwhile, a chain of smaller units including a steel factory with a capacity of manufacturing 8,000 tons of crucible steel and 10,000 tons of commercial steel every year are being constructed in western China for keeping the government arsenals and factories running at full blast.

In Szechuen whose 9,874,000,000-ton coal reserve ranks next in abundance only to Shansi and Shensi provinces and whose iron ore resources are the richest among the southeastern provinces the nation has found a new center for heavy industries. Aside from Chungking which is the home of at least five big iron and steel works and two dozen small machine shops, many others have been found far and wide in this hinterland province. Large factories operated by the government or by private enterprises and native furnaces are working harmoniously to turn out weapons and machinery for China to carry on the war.

In Chungking experiments are being conducted in the production of the higher grade steel alloys such as ferro-tungsten, ferro-silicon, and ferro-manganese. Experiments have been made with silicon by which the native pig-iron was processed into the finest grade of grey iron for steel making. Monthly production of grey iron will now meet the nation's most urgent needs.

Because of the abundance of coal and iron ore mines in the province, Szechuen has to-day at least a dozen private steel and iron works in addition to those located in and near Chungking. Some of these factories are financially independent and all are staffed with men who know their jobs. Others are given financial and technical assistance by the Industrial and Mining Adjustment Administration, which supervises and aids all private factories.

Besides China's heavy industrial plants the native furnaces are contributing no unimportant supply to the nation's war needs. There are approximately 100 native furnaces scattered throughout the province with a total annual output of 25,000 tons of pig iron. In one district along the Szechuen-Kweichow highway 33 native furnaces are working day and night to supply the big machine shops and iron and steel works in Chungking and elsewhere with raw iron. Officials of the Industrial and Mining Adjustment Administration are studying the possibilities of doubling the production of raw iron from the native furnaces by giving them technical and financial help.

Chungking : Home of Chinese Industry

The wave of factory removal westward to the interior has changed Chungking almost overnight into a city of bustling activity. Altogether 350 factories with machinery and equipment weighing 150,000 tons were removed from the coastal areas, and Szechuen, due to its central location and vast natural resources, has accommodated 155 of them. Of the latter number 97 consisted of mechanical engineering works, machine shops, electrical engineering works, chemical industries and mining companies. Many of these factories are found in and around Chungking.

Most of these 97 plants that dot the map of Szechuen (which is as big as present-day Germany) are small establishments. A few of them represent a capital investment as low as 100,000 or 200,000 dollars. Before the war, most of them were located in Shanghai where they enjoyed a brisk trade in manufacturing locks, tools, and mechanical parts. When hostilities broke out, their owners saved them from Japanese seizure by shifting them to the hinterland. Since the outbreak of the war, these small machine shops have been manufacturing hand grenades, trench mortar shells and other simple munitions. Altogether there are 23 such machine shops in Chungking that are operating for the Ministry of War at a reasonable profit.

But not all industries in the wartime capital of China are represented by these small factories. Chungking is now the home of at least five big steel and iron works capitalized at over \$1,000,000 each. From Shanghai came the Ta Hsing Iron and Steel Works which is operating 24-hours a day in the vicinity of Chungking to furnish interior China with a continuous supply of cranes, rails, mountain guns and other valuable products. Working the makeshift buildings which were roughly made of mud, timber and bamboo, there are 700 workers, half of whom were brought from Shanghai. Experiments have been conducted by the experts of the plant to mix silicon and manganese with pig iron so that it can be used for casting. The plant at present has two electric furnaces, one steel foundry and three machine shops, while a rolling mill and a wire nail factory are under construction.

"We are continually seeking new resources here," said Mr. Yu Ming-yu, General Manager and Chief Engineer of the Ta Hsing Iron and Steel Works who studied metallurgy in the University of California, when referring to the development of the underground wealth of Szechuen Province. "Take dolomite for example" he

continued, "we have discovered it in abundance locally over a permian layer of limestone. It is only through gradual search that we will find more mineral resources for industrial needs."

"One of the most important things that we have to do now is to free ourselves of dependence on foreign machinery. Sixty per cent of our machinery was removed from Shanghai, but the rest we made here. We have also reproduced, with improvements, two electric furnaces from our original Danish model which was left in Shanghai," added Mr. Yu.

Another outstanding member in Chungking's heavy industry family is the Hua Hsing Machine Works, which produces raw steel at its own foundries and processes the steel into war products. Mr. K. P. Hu, a graduate of the Massachusetts Institute of Technology, is manager of this plant, and under his direction the laboratories of the Hua Hsing Machine Works are continually active trying to attain the standards of the U.S.A. The Ministry of War has stested the machine-guns put out by this factory and has found them every bit as satisfactory as the imported product. Since October, 1937, more than 100,000 machine-guns have been manufactured in this factory.

Established with the financial help of the Ministry of Economic Affairs, the Hua Lien Iron and Steel Works is one of the important projects of the West China Development Company. When completed in six months, the new plant, capitalized at \$5,000,000, will comprise a 30-ton blast furnace, a power plant, a ten-ton basic open-hearth furnace, a rolling mill, a fire brick factory and two machine shops. Authorities of the factory are expecting that, with the completion of the plant near the end of this year, the manufacture of standardized rails, hitherto dependent on foreign imports, will be possible.

China's Wartime Hydraulic Works

More than \$47,338,000 on river conservancy was spent by the Chinese government through the now dissolved National Economic Council, during the years 1935-37. Much was done in flood control, irrigation, and other forms of hydraulic engineering on the Hwai, the Yellow, the Yangtze, the Pearl, and the river systems in North China. Most of the projects had been completed before the war started in July, 1937.

The Chinese Government, in spite of the interruptions in hydraulic reconstruction brought about by the Japanese invasion, is still pushing ahead its river conservancy program for the benefit of the rural populace. River conservancy works for the Hwai River, the North China rivers, and the lower parts of the Yangtze, the Yellow, and the Pearl rivers have had to be abandoned or discontinued. Full attention is now being given to flood control, water transportation, and irrigation in places not yet ravaged by the Japanese.

Since January, 1938, the Ministry of Economic Affairs has taken over all hydraulic functions of the National Economic Council. The policy which the Ministry is pursuing, has a three-fold purpose—first the development of water communication in the southwestern provinces; flood prevention; and the improvement of the irrigation systems in the nation's north-west and south-west. Development of water communication in the south-west is primarily a military measure. Nevertheless, its commercial importance is self-evident.

The improvement of three important inter-provincial waterways, linking up Hunan and Kwangsi, Kwangtung and Kwangsi, Hunan and Kweichow, respectively, is now under way. The Hunan-Kwangsi waterway 600 miles in length, connects Changsha, capital of Hunan Province, and Wuchow, an important trading town on the West River in Kwangsi. One may sail from the Yangtze up the Siang River in Hunan, through the Lin Canal, down the Kwei River in Kwangsi, and down West River to Canton and the South China Sea. The bottleneck on this route lies between Chuan Hsien in northeastern Kwangsi and Kweilin, capital of Kwangsi a distance of 90 miles. It takes 18 days to complete this short journey and no boat with a load of more than three tons can travel in this section.

The most difficult stretch is the 20-mile Lin Canal which was supposedly built more than 2,000 years ago. The Yangtze River Commission of the Ministry and the Kwangsi Provincial Government are now devoting their attention to the improvement of the 90-mile channel section, dynamiting rocks and building dams and shiplocks.

It is expected that on completion of the work, the sailing time from Chuan Hsien to Kweilin may be shortened by half and vessels with a loading capacity of seven tons may negotiate the entire channel without difficulty.

The Kwangtung-Kwangsi waterway is another important communication link in the south-west. Beginning from Canton and following the Pearl River, the Yu River, the Tso River, and the Lichi, one may reach Nanchin in Indo-China. The entire route is 800 miles in length. At present the upper section is narrow and shallow whereas the lower section is badly silted up. Blasting, dredging, construction of dams and ship locks, and the installation of navigation signs and signals are now going on. The completion of these preliminary works will shorten the sailing time by one-third and will enable vessels with a load of 20 tons to travel the entire distance of the route.

A Hunan-Kweichow waterway already exists in the form of the Yuan River which flows from eastern Kweichow to Hunan. The Ministry has planned the improvement of the most rocky and difficult passes in the middle and upper reaches of the Yuan River in order to permit small steam launches to sail with comparative ease to a point where the river is met by the highway from Hunan to Kweichow. Work in the Taoyuan-Yuanlin section is under way.

Chi River in Szechuen, which runs from northern Kweichow to empty into the mighty Yangtze, passes through a territory immensely rich in minerals. The Hwai River Commission is now building dams and ship locks in order to raise a few of the tributaries of the river so as to permit heavier boats to sail in comparative safety.

A 40-mile waterway connecting the To River and Tzeliuching, southern Szechuen's leading salt center, is undergoing dredging to give free access to Szechuen salt. The Wu River, which connects Kweiyang, capital of Kweichow, with the Yangtze, is also undergoing a process of dynamiting. Dams and ship locks, are being built, in order to facilitate transportation on its 550-miles channel. The 820-mile Szechuen-Yunnan waterway which consists of the Gold Sand River and its tributary Putu River is being improved for the navigation of shallow-draught steamboats.

The Ministry has given much attention to the safety of the dyke systems of the principal rivers as any untimely flood might produce an adverse effect on the general war situation. Therefore strict watch is being kept by the Ministry through its different offices. However in spite of all precautions, the Yellow River dyke collapsed in June, 1938, and the river turned south and south-east in Honan Province, entering the Hungtze Lake in northern Kiangsu and Anhwei which empties into both the Yangtze and the sea. The Japanese are still occupying some of the districts where the dykes broke, and it is impossible for the Chinese to repair them. If this state of affairs continues, there is the danger of the Yellow River changing its course as it did in 1873.

The dykes of the Yangtze and the Han River are rigidly watched by agents of the Ministry. Except for a minor break of the Han River in June, 1938, which inundated a small area in Hupeh, the entire situation has been satisfactory. Conservancy activities on the Pearl River have been carried out without a hitch.

China's Backward Province

Hitherto known as one of the most backward and poorest provinces of China, Kweichow in the South-west is undergoing vast changes as various reconstruction projects are being pushed to make this mountainous country productive. The ushering in of 1939 means another busy year for the provincial officials, who, besides carrying out old plans and starting new ones, have dedicated the new year to the full enforcement of army service throughout Kweichow.

Under the leadership of Governor Wu Ting-chang, who was formerly a successful banker and Minister of Industry prior to his present post, the 10,000,000 inhabitants of Kweichow who are scattered in 179,478 square kilometers are being taught all that science and modern organization can do in the way of improving their livelihood and so increasing their usefulness to their nation. Never before in the history of Kweichow has modern civilization been so sweepingly introduced into this province as it is to-day when the nation's new political, cultural and industrial forces from the coastal cities have come to awaken the long slumber of the natives. During 1938, various reconstruction measures

embracing agriculture, mining, industry, communications, people's livelihood, opium suppression and administrative reform, were launched. According to an Official report of Governor Wu, the wartime reconstruction of Kweichow Province may be outlined as follow:

Although the wealth of Kweichow lies mainly in its mineral deposits, the agricultural possibilities of the province, where the climate is mild, soil fertile and rainfall plentiful, also deserve special attention. A recent survey shows that although only 20 per cent of Kweichow's land is cultivable, there is still eight per cent of rich regions left uncultivated; while at least 80 per cent of the mountains are entirely bare, hence there is ample room for a great reforestation campaign. To extend the annual output of cereals from Kweichow, which has been given at a little over 70,000,000 quintals as compared with a 2,158,000,000 quintals from Szechuen, the provincial authorities, in co-operation with the Ministry of Economics, has brought science into the province with the establishment of rural welfare centers and agricultural experimental stations.

After months of research, the planting of cotton, which formerly was the least cultivated but the most needed product in Kweichow, has been successfully carried out in fifteen districts from which it is expected to extend into other districts in the spring. Veterinarians, hitherto unheard of in this province, have flocked to Kweichow where preventions against animal diseases have already been started. The cultivation of tobacco leaves for which Kweichow is renowned has been improved while wheat and cabbages have been substituted for the opium which once flourished in the fertile Kweichow fields. The quality of raw silk has been bettered and standardized following the cross-fertilization of Szechuen silkworms with the native species. The experts are now laboring on improving seeds and fertilizers and on eradicating pests and insects from the Kweichow farms, with particular attention on promoting the output of wood oil, cereals, tea, silk, sugar-cane, fruits and medicinal plants. Meanwhile, a vast reforestation program, which aims at turning at least 143,000 acres of barren regions into well-wooded lands every year, has been inaugurated by the provincial reconstruction department.

Aside from the technical side of the agricultural problem, the provincial government is doing everything it can to ease the flow of money and to improve transportation conditions in rural communities. Already over thirty districts have established co-operative credit stores while many others have built granaries in which are stored huge quantities of emergency food supplies. Many financial institutions and transport offices, designed to help the farmers and to increase their production, have been installed with Government subsidy and supervision. The provincial Government has already spent over \$7,800,000 for the development of Kweichow's agricultural resources, which sum may be increased by another \$10,000,000 in the future, according to Governor Wu's ambitious plan.

No less than twenty districts of Kweichow's "precious tract" contain rich gold deposits, particularly in the Van-ting Mountains where preliminary surveys have already been conducted. Plans for opening up new mercury, antimony, coal, copper and iron mines have also been mapped out, while a big iron and steel plant and a cement works will soon be erected in Kweichow. The mining affairs of the province are to be concentrated in a special bureau created under the joint auspices of the Ministry of Economics, the National Resources Commission and the Kweichow Provincial Government. With the completion of the network of communication systems, which include ten new inter-regional highways, the Chengtu-Kweiyang section of the Szechuen-Yunnan railway and the Kweichow-Kwangsi railway and numerous highways, Kweichow is expected to be one of the chief mining centers of the nation.

Closely related to the development of traffic routes between Kweichow and the outside world is the establishment of factories in the province. To be installed shortly are four oil refineries, three flour mills, two tobacco manufacturing plants, three sugar refineries and a number of cotton mills, while the formation of other semi-official factories for making leather, wool, paper, medical and chemical supplies has also been encouraged. Simultaneous with the growth of industries in Kweichow is the promotion of handicrafts. Native methods for manufacturing wine, paper, bamboo and cloth have been greatly improved and popularized

and ways and means to improve home industries have been studied in the rural communities. Along with Kweichow's industrial development will be the utilization of its water power. Before long a new power plant to be capitalized with \$1,000,000 and representing a joint enterprise of the Ministry of Economics and the provincial government, will make its appearance in the province. The advent of power for industries uses, together with the installation of new long-distance telephone lines and radio communications, will make Kweichow a modern and prosperous unit in China's tremendous South-west.

Rural Reconstruction in Kwangsi

Never before has rural reconstruction in Kwangsi Province in China's South-west been so intensively fostered as to-day. The intensification of this movement in Kwangsi was begun on January 1, 1938, when the Agricultural Credit Administration, in collaboration with the provincial authorities and the principal banks, inaugurated a system of mutual aid societies as forerunners of farmers co-operative societies.

Six months afterward, it was officially reported that the number of these mutual aid societies stood at 2,727, scattered in 25 counties, with a total membership of 113,901 persons, representing an equivalent number of farming households. The aggregate amount of money loaned to these members at one time reached \$1,490,955.50, all of which was used for productive purposes.

Realizing the farmers' increasing need of capital for the purchase of equipment, seed and livestock necessary for intensive or extensive farming, the Agricultural Credit Administration and the institutions concerned almost simultaneously organized agricultural co-operative societies in 14 larger districts.

Among the primary purposes of such a society are the extension of loans to members at an interest less than the current market rate when the money is needed for productive or manufacturing purposes, and also to receive deposits from members on which interest will be paid at a higher interest than the current market rate. Moreover, the society attempts to offer insurance to members against sickness, accident and business risks, as well as to make purchases of agricultural equipment for the members.

It was officially learned that the number of counties in Kwangsi having co-operative societies increased from 14 to 45 last year; the number of such societies found in these 45 counties was 527, with a total membership of 14,613 persons, or an average of 27.7 persons per society. There are seven kinds of such societies in Kwangsi, namely, credit, consumers, supply, production, marketing, public utility and insurance.

With the development of co-operative societies has been the inauguration of co-operative banks by the Agricultural Credit Administration. Thus far 23 such banks have been organized in Kwangsi. Each bank is capitalized at \$80,000 to \$100,000. Last year, a total of \$301,681 was loaned by these banks to members of the societies for the promotion of productive reconstruction. For the first four months of this year, the loans were granted for the following purposes:—

Seeds	\$ 5,950.50
Fertilizers	11,102.50
Implements	2,448.50
Livestock	38,143.50
Food	12,209.50
Debt payment	1,719.50
Employed labor	2,073.00
Land reclamation	1,080.00
Miscellaneous	7,026.00
Total	\$81,753.00

As a part of the rural reconstruction program in Kwangsi, the government-endowed agricultural experimental stations have distributed this spring improved seeds of rice, cotton and sugar-cane gratis among the peasants and from time to time have been dispatching experts to teach them more efficient ways of using fertilizers.

Japan Building First Undersea Railway Tunnel

Tube Linking Islands of Honshu and Kyushu, from Shimonoseki to Moji is an Undertaking Filled with Hazards

By W. HARVEY CLARKE, Jr.

FAR down below a swiftly changing tidal current that twice every 24 hours races treacherously through the almost mile-wide channel of the Shimonoseki Straits separating the main Japanese island of Honshu and Kyushu, the second most populous, a hardy group of daring sandhogs, workers who labor in compressed air, are burrowing ahead through unexplored depths of submarine earth strata, rushing to complete in 1942 construction of the first undersea railway tube ever known to have been undertaken by modern tunnel engineers.

Like a monster angworm of metal, with several thousand segments going into its more than two-mile-long body, including the inclining approaches at each end, the Kwammon Tube will link the important railway termini of Shimonoseki and Moji, thereby enabling the saving of an hour's time for train passengers, ten hours for freight in transit and reducing by more than a million yen the annual ferry transshipment expense to the Japanese Railway Ministry—from its present outlay of ¥1,500,000 to about ¥450,000.

In order to meet normal needs for heavy passenger and freight traffic between the two islands, as well as to provide adequate facilities for anticipated increases, the Ministry's plans for the future include a twin tunnel to parallel the Kwammon and a second pair of railway tubes for limited expresses on the projected standard broad-gauge line to run southward from Tokyo.

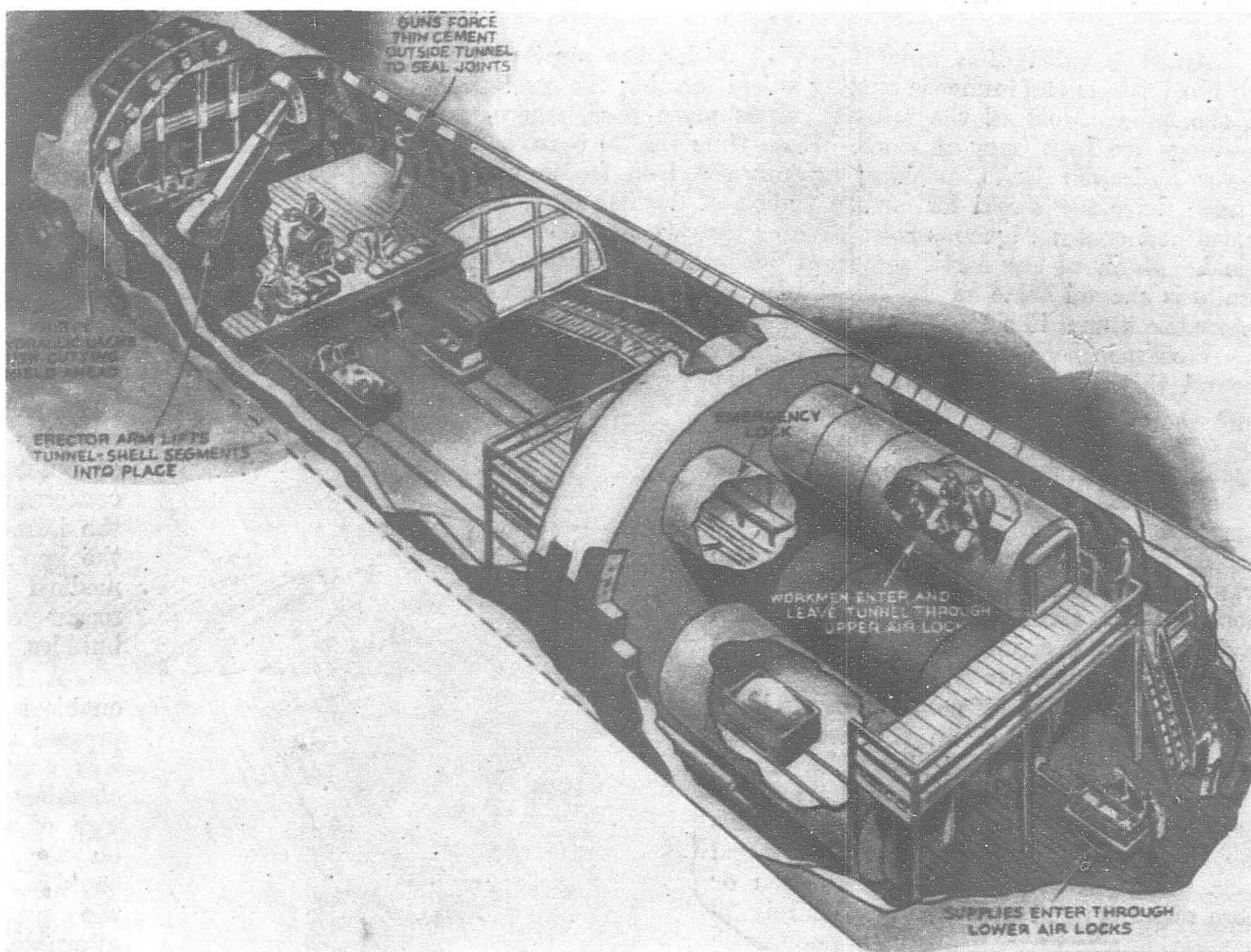
The hazardous lives of the sandhogs who are making most of the Kwammon Tube a reality depend upon the invisible factor of air pressure; for the heading of the undersea tunnel section now being bored from the Moji side is not driven by blasting through rock nor by manual digging. It is advanced by "shoving blind" through the mixed earth strata and agglomerate structure composing the bed of the straits. A compressed air, crown shield, resembling a huge biscuit cutter and weighing close to 400 tons, is forced ahead, a few inches at a time, by a battery of hydraulic jacks capable of exerting a push of some ten million pounds. The air pressure, which is varied within the 70-foot-long chamber of the advancing tube, according to the depth of the channel water above, keeps out water and muck while the nearly 24-foot-diameter rings are bolted into position to form the tunnel walls.

Before stepping on the open lift descending to the air lock, a doctor examines one's heart, lungs and ears. After having slipped into overalls, pulled on galoshes and donned a protecting synthetic-resin helmet, you are carried down a vertical shaft about ten feet in diameter for almost 150 feet to follow an engineer-guide along the completed tunnel section and through a small door leading into the air lock, the cylindrical steel chamber of which is about eight feet in diameter and 20 feet in length. It suggests an oversize locomotive boiler, studded with rivets and coated with lead paint. Four of these locks are in the end of the tunnel. Two

are used to pass supply materials, one is for workmen and the fourth for an emergency exit should the tunnel ever become flooded.

The steel door is closed from behind. The lock operator moves a small lever and a hissing, muffled roar fills the chamber. One's eardrums ache with the mounting pressure of the air. You swallow, yarn, hold your nose and blow hard to clear out the head passages and to equalize pressure on the drums. A rigid rule adhered to in air locks is that the operator must close the valve if a sandhog raises his hand as a sign that he is "blocked up" or unable to clear out his head. At times this occurs when a workman has a cold, and halting the increase in pressure for a few moments may prevent the rupture of an eardrum.

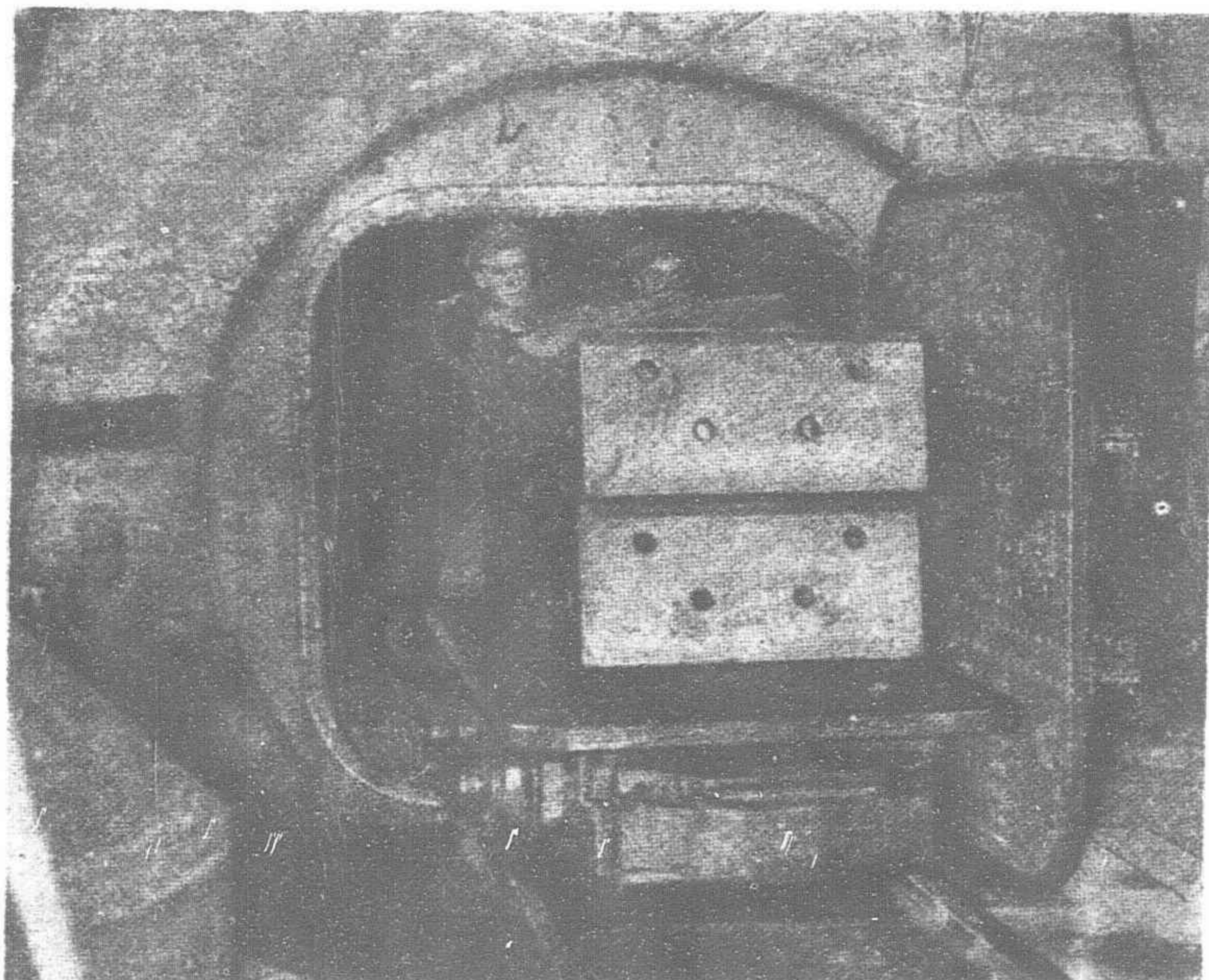
The moving needle on the pressure gauge swings slowly past 5, 10 and 15. At 16, the number of pounds above atmospheric



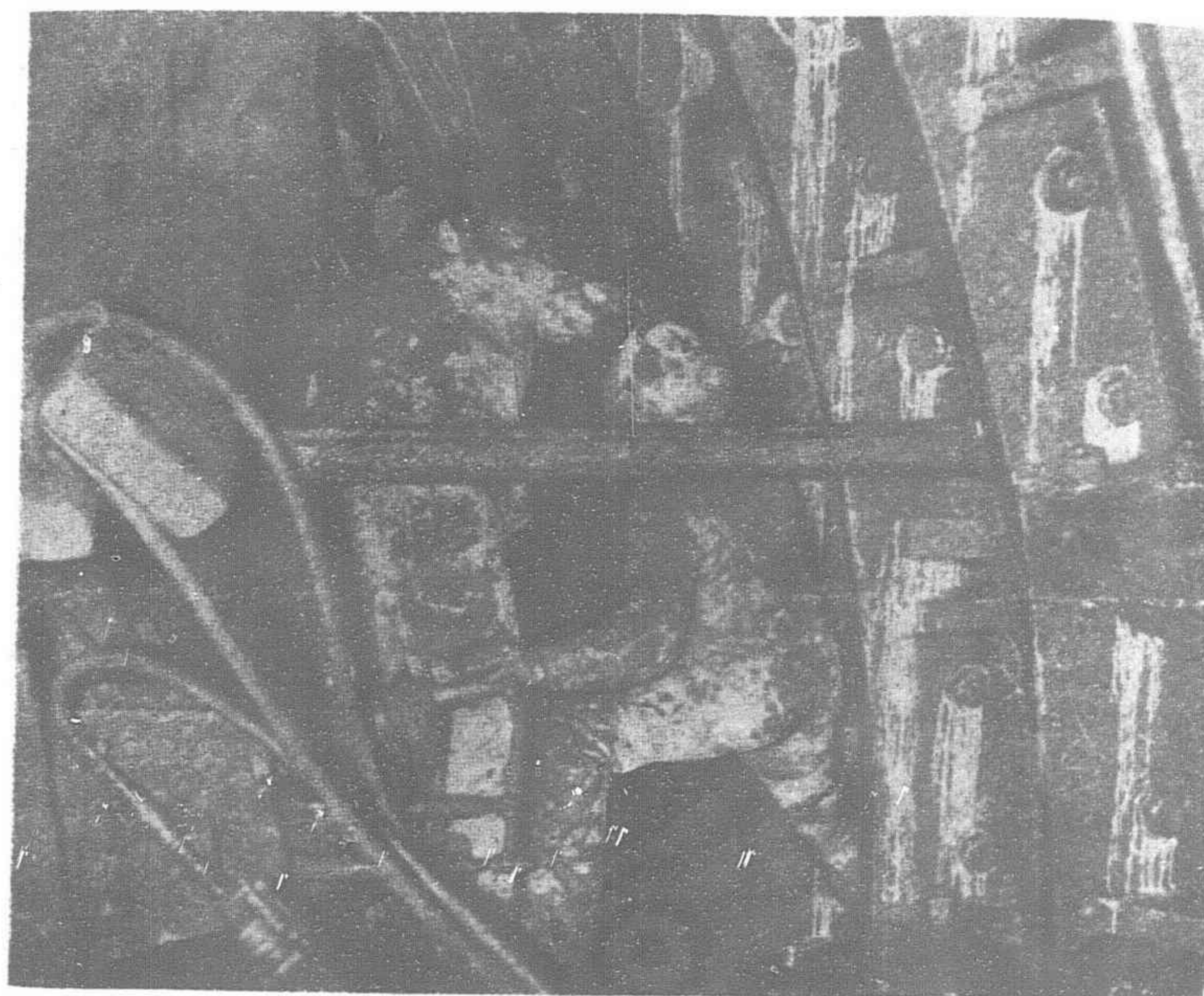
Cutaway view of an undersea tunnel in process of construction, showing the air locks, cutting shield, erector arm and the general arrangement of a compressed air chamber where sand hogs toil

pressure at which the sandhogs usually work, the operator closes the valve, the door at the far end of the chamber is opened and you step out into the electrically lit dimness of the tube's interior. The series of lights reveals a seemingly endless succession of metal rings curving far overhead. They rise as high as a two-storey building. The air presses against your face with a heavy, earthy dampness. Picking your way down the tube, you discover curious things about the effects of compressed air.

The voices of the men sound nasal; for under high pressures all voices sound alike. Make an attempt to whistle and only the high notes can be heard at all. At 50 pounds pressure, a man can neither whistle nor whisper, while a violin played in compressed air loses half of its tonal volume. Because of the concentration of oxygen in the air, breathing is less frequent than under normal atmospheric pressure.



A hand car loaded with supply materials for tunnel workers at the shield being pushed out of an air lock into the tunnel workings. All men and equipment must pass through these air compression chambers



Workers in tunnel bolting together the huge metal segments that form the tunnel wall. Pneumatic wrenches, such as the one pictured here, are used to tighten the heavy bolts

About a third of a mile (1,760-ft.) under the straits from the Moji side is the immense cutting shield forming the steel nose of the tube. Most of the activity takes place here, where the sandhogs are kept busy at work. Each time the 30 or so super-power hydraulic jacks, pushing against the iron frame of the tunnel, drive the shield forward, a ribbon of darkish clay, sandy gravel and crushed igneous rock streams through a crevice in the shield. Much of the earth structure beneath the bottom of the straits is shoved aside as the shield advances, but a portion of it enters the tunnel like toothpaste squeezed from a giant tube.

Workmen with wires and shovels gather around this ribbon of silted earth. They slice it into smaller pieces and toss them back to be spread over the floor of the tunnel for ballast. When the finished tube is being lined with concrete, this ballast is removed.

As the tube must follow the exact line drawn for it on the plans, its directional movement is ascertained by the "tunnel navigator" who sights through a transit at a target some distance away.

At the end of each forward shove, a huge erector arm, mounted on the rear of the shield, swings 3,000 pound pieces of iron into position for sandhogs, operating pneumatic wrenches, to bolt into a ring that adds about 30 inches to the lengthening metal tube. Each of these rings has a dozen or more segments and weighs approximately 20 tons. The erector arm, the pneumatic wrenches and other technical aids help to speed up construction work.

Walking back toward the air lock, you pass men pushing hand cars loaded with bolts, tools and other materials to supply the workers at the shield.

Crawling into the air lock again is the critical part of the trip; for coming out of compressed air, not going into it, is where the hazard lies. Under pressure, nitrogen gas within the body is turned to liquid. When the pressure is relieved it is reconverted to gas, just as bubbles will form in a carbonated drink when the bottle cap is removed. Unless decomposition is slow enough to let the body eliminate these nitrogen bubbles, they lodge in joints and tissues and within a short time cause an

attack of caisson disease, or "the bends." This name is derived from the fact that a victim bends and writhes in agony in seeking relief from pain produced by the bubbles. The remedy is always the same—recompression followed by very slow decompression.

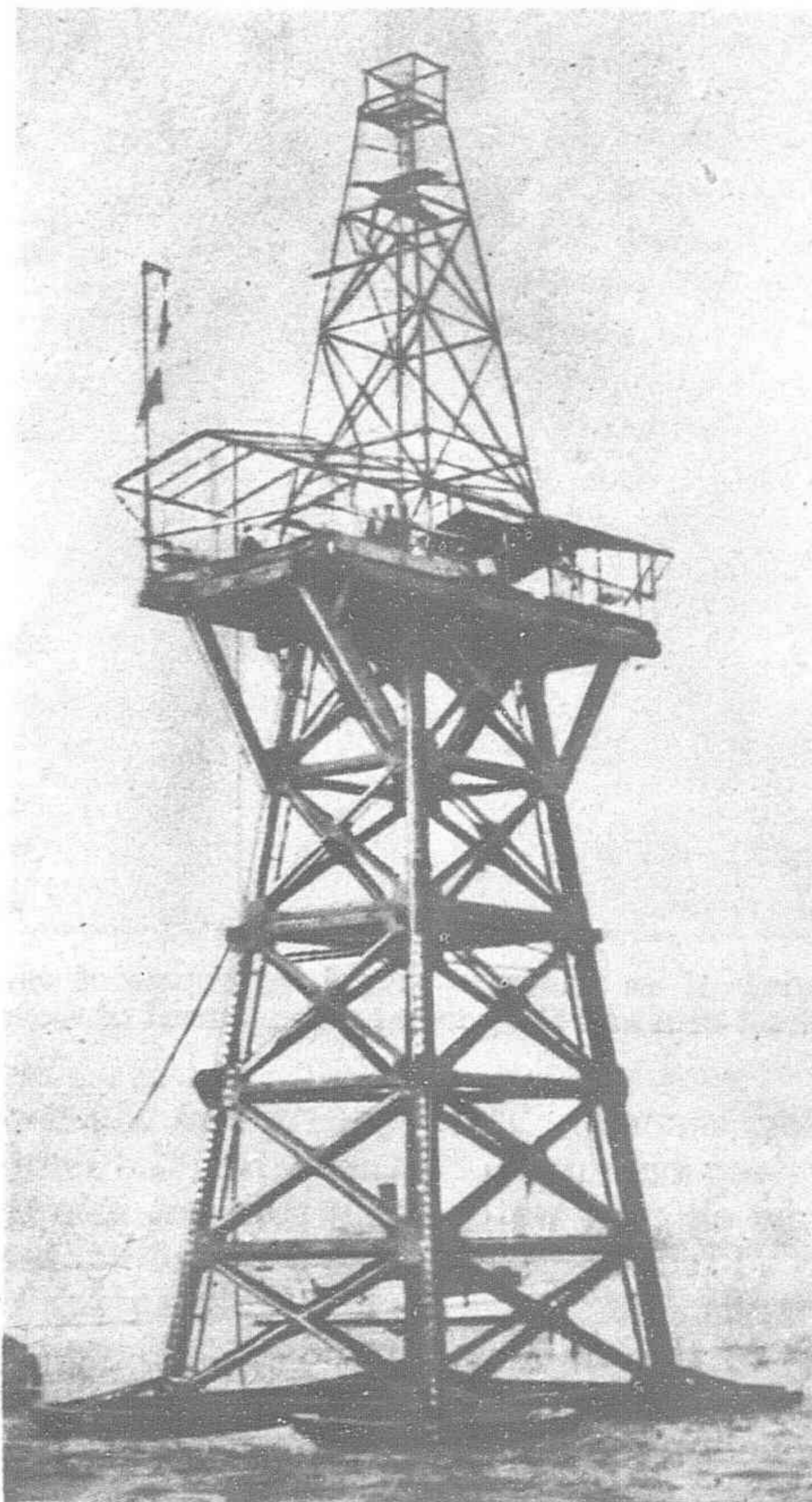
Occasionally these attacks come in strange forms. In one case, a sandhog had the bends in his teeth. A bubble had lodged in a cavity. It drove him frantic until he could return to the air lock. In other instances, nitrogen bubbles have found their way into the layers of fat beneath the skin, producing a fearful itching sensation. A bubble finding its way into the spinal column or the brain can cause paralysis.

A century ago, when the French engineer, Triger, used the first pneumatic caisson on record to mine coal deposits under a stratum of quicksand, hardly anything was known concerning the effects of compressed air on the human organism. The first attacks of the bends observed were a mystery to the medical profession. Only in comparatively recent years the cause was traced to nitrogen bubbles.

A frog's hind foot, it is chronicled, enable scientists to learn exactly how compressed air affects men. The little creature was confined in a small glass compression chamber with a microscope trained on the web of a foot. With strong back-lighting on the membranes, the research workers could watch bubbles form and disappear as the pressure within the chamber was alternately lowered and raised.

Medical authorities on caisson disease say that no worker in compressed air is immune to the bends. Without taking precautions, an oldtimer is as subject to attacks as a newcomer, and fat men are more susceptible than thin ones. Most attacks occur within an hour after leaving work and practically all of them within six hours after returning to normal pressures. Exercise taken during the period of decompression will speed up the elimination of the nitrogen by increasing circulation, and thus aid in preventing the bends.

Three factors govern an attack of caisson sickness—the pressure under which the men are working, the length of time they stay in the tunnel and the time they take in coming out. Normally, the time spent "in the air"



This submergible steel turret, in the summer of 1936, was towed from one spot to another for test borings made by cutting vertically into the channel seabed in Shimonoseki Straits to bring up samples of submarine earth strata along the course where the Kwammon tunnel was to be driven

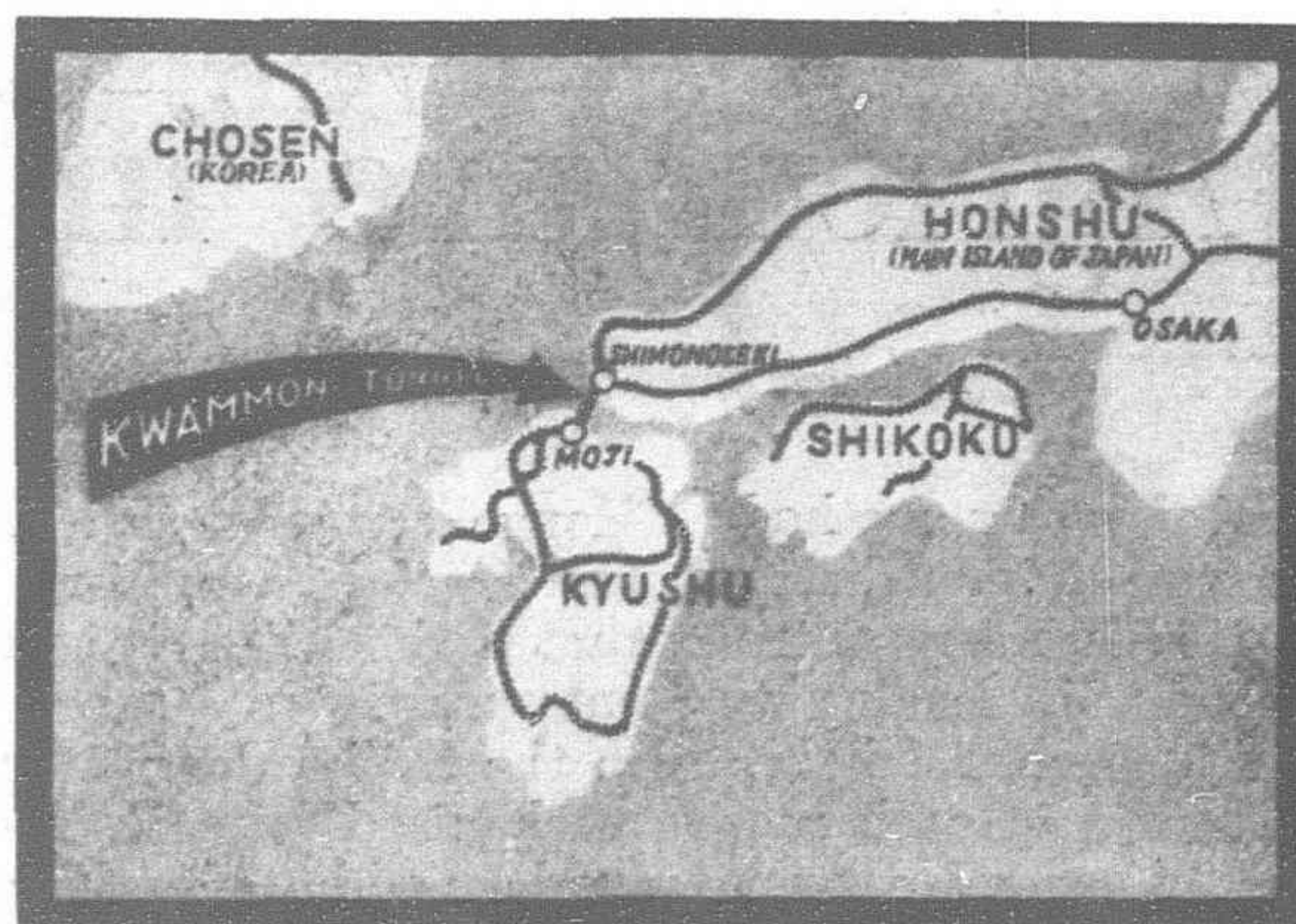
is governed by the pressure. At 16 pounds, for example, sandhogs can work six hours a day in two three-hour or three two-hour shifts with three or two hour rest periods in between. At 50 pounds, a day's work should consist of two half hour shifts.

You notice, as you watch the air-lock operator on the way out, that he keeps his eyes on a clock near the pressure gauge. For each caisson pressure there is a regulation setting a minimum decompression time. For 16 pounds the time is ten minutes. As the gauge needle swings slowly back around the dial, there is a continuous crackling in your ears. The strain on the drums now arises from the fact that the pressure outside the drums is falling faster than that inside. The operator, who spends all his working hours going "into the air" and out again, is never distressed. Once in a while he opens his mouth to yawn—and that is all.

A chill strikes your body upon leaving the heated air lock. Sandhogs are usually served a hot drink at the end of their shifts. As you slip off the dirt-laden overalls, galoshes and helmet, you begin to understand more fully the hazard and strain of a sandhog's work, and that knowledge gained from the results of research is eliminating some of the danger shadowing the daily life of a sandhog.

Engineers in charge of constructing the Kwammon Tunnel, headed by Supervisor Iwao Kugimiya, who directs the Shimonoseki Improvement Office of the Railway Ministry, realizing the major obstacles incident to undersea excavating beneath the Shimonoseki Straits, made extensive preliminary test borings to determine the geologic character of the substrata of the sea floor under which the tube was to pass. Besides identifying earth faults in three different places, examination of the cores brought up from a series of borings revealed nine varieties of earth structure, including one of hard igneous rock, that must be encountered in driving the tunnel.

It seemed to be evident that prehistoric volcanic action accompanied by seismic disturbances causing subsidence and formation of the Inland Sea had simultaneously formed the straits. Long continued erosion of sedimentary soil on the Moji side was found to have exposed igneous rock of such resistance that 11 or 12 inch cores were the largest that could be secured by vertical boring tests.



After about two and a half years of work, on last April 19 a pilot tube, four-fifths of a mile long connecting Shimonoseki and Moji, and about 160 feet below the seabed, was bored through at a cost of ¥1,300,000, when an eight-foot wall of conglomerate between the two headings of the tube, about 1,870 feet from the Shimonoseki side and 2,467 feet from the Moji side, was blasted away by tappings of dynamite.

Horizontal excavation was begun simultaneously at both ends in September, 1936. This test tunnel, which is about nine feet high and seven and a half feet wide, was driven through primarily

to study the nature of the sub-channel earth formations and for a drain to take up seepage from the main tube. On an average it lies 36 feet under the line of the railway tube. The middle portion of the latter when completed will be slightly lower than its portals. Water seeping through from the seabed will flow by gravity to the center, where it will run out into the drain tube below, which is higher at the center by an upward gradient of one in 700 than at its extremities toward which excess water will escape to the outside to be drawn to the surface by suction pumps installed at a point about ten feet from the bottom of the well-shaft sunk at each end.

In the Shimonoseki-side heading of the Kwammon Tube, which has been pushed nearly 2,000 feet beneath the straits, ordinary tunnel driving procedure has been employed satisfactorily. Air-shield driving for the main tube on the Moji side is in its fourth month. The work here was delayed continually when excavating began, by seepage, earth faults and other factors interfering with smooth progress. For a time, workers were able to drive the pilot tube only three inches a day. Early stages of construction were the slowest. The middle portion of the drain tube was the least difficult. Only two-thirds of this tube had been completed up to December, 1938, in 27 or 28 months of constant work. The remaining third required approximately three months to bore.

All told it took 195,000 man hours of labor to finish the pilot tube, which is about four-fifths of a mile in length, including the two vertical well-shafts. Its excavation required more than 28,090 metric tons of dynamite and in excess of 113,000 sacks of cement were used in lining the completed tube.

Industrial Program of Japan and the Yen-Bloc Countries

(Continued from page 325)

scheme, output of pig iron is placed at 5,000,000 metric tons, steel ingots 3,500,000 tons, rolled steel 2,000,000 tons, coal 38,000,000 tons, and heavy oil 2,000,000 tons. The plan also calls for production of automobiles, aircraft, and certain chemical products, concerning which no definite scheduled production figures have been published.

The results attained during the first year were not entirely satisfactory, owing to the limited stage of industrial development in Manchuria, and the subsequent shortage of labor and materials which followed the outbreak of the Sino-Japanese incident. The projected iron and steel expansion programs were carried out with some degree of success, but little progress was made toward the goals established for increased production of coal and other commodities. More headway was made in 1938 with the arrival of industrial machinery and equipment from Japan, but increased difficulties in carrying out the scheduled production increases are anticipated during the next three years.

It is estimated that no less than ¥4,750,000,000 (\$1,378,000,000) will have to be raised if the plan is to be carried on to a successful conclusion. Another problem is where to obtain the necessary skilled labor. Training schools have been established and the immigration quota for Chinese coolies has been increased, but, according to reports, these plans fall far short of the estimated annual demand for 70,000 technicians who were formerly supplied by Japan. It is reported that the industrial expansion program has undoubtedly been hampered as a result of this labor deficiency.

Industrial Development of North China

The plan for North China's development envisages development of transportation, communications, the iron industry, coal mining, electric power generation and transmission, salt production, and coal liquefaction industry by a semi-official concern known as the North China Development Co. This concern will establish subsidiary concerns to handle the actual development work of the various phases of the industrial expansion program. It is estimated that the program will involve an expenditure of approximately ¥1,420,000,000 (\$400,000,000), the financing of which has assumed considerable importance.

The industrial expansion program which has been outlined for Japan, Manchuria, and North China for completion by the end of March 1942, is one which would have far-reaching effects on the trade of the United States with these territories if self-sufficiency in the various items were to be actually attained. A survey of the 1936 foreign trade returns of the United States, the year prior to the outbreak of the China incident, has indicated that the value of the shipments to the yen-bloc countries of the commodities in which they seek self-sufficiency totalled \$94,079,032, or approximately 3.9 per cent of the total export trade of the United States during that year. Of this amount, exports to Japan totalled \$90,392,479, those to Kwantung \$1,879,263, and those to all of China, excluding Hongkong, \$11,807,290.

Mechanized Agriculture in Manchuria

(Continued from July, 1939)

HISTORICALLY summed up mechanized farming methods in North Manchuria go back to the period immediately after the Japanese-Russian War. The Russians introduced mechanized farming into Manchuria leading to present conditions, but having in mind that agricultural habits are specific with each race, long traditional usages of each race cannot be expected to undergo swift changes. In general, present day agricultural methods in Manchuria are those of the Chinese. In this land the Japanese, accustomed to the damp warm climate of their home islands, have encountered conditions entirely new to them. The immense racial adaptability of the Japanese is finding full scope for expression in Manchurian farming and they are progressing to evolve farming methods suitable for their own uses, originating rather than seeking to imitate methods hitherto in use in this land.

Live Stock on Farms

Assuredly the most enterprising of groups of Russian agriculturists in Manchuria are those of the Sanho district. It is a special characteristic of the Russians in this district to employ certain agricultural tools, particularly mowing machines. They own and employ a large number of these indicating the close relationship between their purely agricultural work and cattle breeding. Hay making is essential to the Russian agriculturists, who make a paying business of cattle breeding. This enables them to prosper. The intense cold of this region has certain special advantages for those engaged in cattle breeding. Inedible weeds as well as husks and bean curd supply sufficient fodder to raise cattle which in turn supplies nourishing meat and milk that enables the farmers to withstand the cold and survive in the zone above 50°N. Latitude. Since prehistoric times the Muscovites have roamed the vast steppes between Europe and Asia and the Russians in the Sanho district follow a similar primitive form of life. It is to be added that cattle breeding in this inhospitable region is not much affected by climatic restrictions such as temperature, quantity of rain, or frost, which are factors of major importance to the agriculturists depending solely upon crops.

The extensive plains and the areas of swampy lands common to North Manchuria are unsuited for farming, but these have high value as grazing places to the cattle breeders. Slopes above 40° inclination and farming land after harvest leave good pasturage for live stock, but have little value for farming. Although in the Northern areas of excessive cold kaoliang, soya beans and other crops with husks and hulls are difficult to grow successfully, nevertheless cattle breeders of these regions can use these stalks to feed their cattle. It is to be remembered too that cattle can consume refuse, produce manure, supply clothing and provide transportation facilities.

It is not to be forgotten, however, that in connection with cattle breeding in North Manchuria special disadvantages also exist for agriculturists. Cattle breeding requires large expanses of land and the use of large areas for such purposes conflicts with other agricultural activities including planting fodder to feed live stock.

Cattle require large quantities of food, particularly in the Arctic cold of North Manchuria. The storing of large quantities of fodder to feed live stock through long winters also provides a special problem for the farming classes. It is necessary for cattle-breeders of these regions to act independently or in co-operative action to prevent ravages of cattle epidemics. Another adverse factor for the cattle-breeder in Manchuria who also is a farmer, is that he is robbed of the farmers' normal resting periods, for he is obliged to attend to his cattle all through the year.

With all the advantages and disadvantages taken into consideration, it appears that these settlers in Manchuria more surely preserve their security by including cattle-breeding in their work. In this connection it is to be recalled that in the reclamation work in Asahigawa in Hokkaido, Japan, settlers who were tempted to gain their livelihood from the land without live stock, failed in their agricultural venture. With temperatures ranging from subfrigid to frigid North Manchuria connects geographically with

Mongolia and Siberia. This furnishes another reason why settlers find special advantages in engaging in cattle-breeding. It seems that if this phase is ignored, the success of settlers in agricultural enterprise, is in danger. It is to be noted that the Russian villages in the Sanho district have been able to carry on self-supporting mechanized farming chiefly because they have long kept grazing herds in addition to their agricultural work. Their success has been due to this circumstance, not to any special superiority in their method of farming.

Period of Prosperity

Agriculture in Manchuria made immense advances in the period from 1923 to 1929 and in the four years from 1926 to 1929 mechanized farming tools were imported in large quantities. Blessed with bountiful harvests in these times and generally profitable business, Manchurian farmers were quite willing to expend large sums for various mechanized farming tools as they believe that these would greatly expand their undertakings with resultant increased profits.

It is reasonable to expect a constant and continuous increase of imports of mechanical farming implements into Manchuria. Even though crop markets maintain only normal prices. This is true because mechanized farming decreases manual work, greatly increases harvests and insures greater financial returns.

Reviewing the existing records from the days of Mr. L. S. Palen in Suipin-hsien twenty-five years ago down to the brisk tracker operations of the present day by the Manchuria Development Corporation it is at once apparent that for general reclamation work, apart from farming, a few farm tools and mechanical horse-power are immensely superior to native tools and methods. The superiority of tractors for shelling is already well known to those familiar with the proper use of tractors.

Some brief comment may be warranted regarding the twenty-five foreign style agricultural farms that are being operated. Among these four experimental farms and five organizations under direction of the North Manchuria Development Corporation and the Railway Directorate will be excluded from consideration, as these involve tractor operations for reclamation and other operations carried on a non-profit making basis.

Of the other sixteen farms five are directly managed and operated by public organizations under direction of Manchoukuo officials. Three others are owned by Manchus, one by Japanese, one by Russians, two are under subsidy of North Manchuria Development Corporation, and four are under direct or indirect subsidy of the South Manchuria Railway Company. The most prosperous of the whole group and the best paying are those operating old farm tracks having had long experience. Those who follow most closely the example of the group first named prosper in second place, in the first group is to be mentioned the fifteen-year-old Oronzoff Farm at Yakushih, the twelve-year-old enterprise of the Yi Tai at Fuchin, and the eleven-year-old enterprise of Ta Yu-yu of Noho as well as Sato's mechanized farm at Fengwangcheng whose proprietor successfully employed extensive experience he gained in America in his present enterprise. All these experienced various kinds of hardships before they attained their success of the present day.

In the second group the Ta Hing-chuan in Noho and the Hsieh Ho Farm in the North Hingan are to be mentioned as having made the most notable results. Also the Kolonbail Development Guild which acquired early experience in experimentation in Hokkaido, Japan, it is said, has made a fine start in its first year of operation. It is expected that the Manchurian farms, Yi Tai, Ta Yu-yu and Ta Hing-chuan, will return satisfactory harvests of wheat, soya beans and millet as a result of the use of tractors. It is reported that beans and millet make up thirty to forty per cent of the crops from these farms.

Shortcomings Pointed Out

A certain measure of criticism has been directed against farms being operated under public bodies of the State of Manchoukuo.

Those operating these enterprises have been warned that although the enterprises have been correctly planned, actual operation has departed from accepted agricultural methods with the result that the enterprises may meet with a measure of failure. From all the foregoing it would seem that it cannot be declared positively that mechanized farming in Manchuria is either highly profitable or wholly unsuccessful.

On the whole it appears to be quite probable that agricultural enterprises properly conceived and carefully following methods that in the past have proved successful can be made highly profitable. It is to be remembered, however, that if all the conditions for success are not followed faithfully, the efforts easily can be converted into failure. Undoubtedly after thirty years history of mechanized agricultural industry in Manchuria the fullest measure of success has not been attained and progress in general has not been what it might have been expected to be. This may be attributed to intermittent periods of political unrest and disorders in the course of which settlers were obliged to leave their land untended and uncared for. Owing to these factors mechanized farming in Manchuria still remains in a somewhat primitive state and, therefore, much is left to the responsibility of Japanese agriculturists who have made their entry on the scene at this late date. It is to be expected that many new methods of operation will be introduced under Japanese guidance so that rational production and marketing will be achieved with consequent assured profits.

In the whole field of agriculture in North Manchuria it is to be observed that the Han race remains faithful to its primitive manual methods handed down through the centuries, and it is to be said that these workers do attain a measure of success in a restricted sense by following their ancient system. To attempt even a partial reform of the method of these workers would be difficult and impractical; to effect a complete reorganization of their methods would be impossible.

Russian Methods Inadequate

It is apparent also in North Manchuria that the Russian methods of agriculture have not advanced with the ever-progressive Western system of farming. The Russian settlers have also remained in their own primitive stage which originated with the Siberian peasant. The Russian system can scarcely be called foreign-style mechanized farming, but on the other hand is a nomadic form of agriculture invariably accompanied by cattle breeding. This has been made possible because the Russians long have had control of vast treks on which they could both grow products and at the same time find pasturage for their live stock.

It is impractical to attempt generally to adopt Russian methods in North Manchuria where the land is more precious than in Siberia. It is to be noted also that several European and American agricultural enterprises in Manchuria ended in failure. In some measure this was due to an extravagant initial outlay of funds without taking into consideration conditions within the country. Steady profitable progress in the agricultural industry in this region under the direction of Manchus and Japanese belongs to the future. It may be said, therefore, that this great land holding a vast potential agricultural value still remains a virgin soil.

The native farmer on the ground, whether Han or Manchu, undoubtedly would ask, "what other agricultural methods than those that we have so long followed can be applied successfully to these lands?" It is a fact that the majority of farmers in Manchuria to-day are these Hans and Manchus. They cannot be regarded as an important factor in the future agricultural development of the country. Even their methods will have to be reformed to some degree to meet present day conditions.

Under the heading of shortcomings in business practice in Manchurian farming. Perhaps criticism can be based on the common complaint against inferior staple crops. The underlying cause of such inferiority is the careless mixing of seeds resulting in mixed sowing, producing crops that cannot be winnowed by the best of machines. For example, red beans cannot be separated from soya beans of the same size and weight. Such defects are to be traced back to careless reaping and shelling, and farther back still to wrong selection of seeds. It is apparent that selection of seeds, sowing, reaping and shelling should not be left to the conventional farming methods.

A demand that has been put forth, particularly by Japanese agricultural settlers, is for improved weeding devices and it is

reported that new forms of mechanical equipment for weeding shortly are to be introduced. In this connection the purpose will not be merely to remove weeds, but also to decrease and prevent their growth.

A Fundamental Problem

Ploughing and ploughing methods present a fundamental problem for the Manchurian agriculturists. The ploughs that traditionally have been used by the Manchus are of cast iron, are fragile and break easily. Ordinarily the wood parts of such ploughs are not strong enough to do the work they are expected to do. It has been a common practice to join together by primitive methods many pieces of wood in these ploughs increasing their lack of durability. Further, the point of contact with the ground of such ploughs commonly have such width as to cause heavy resistance, often to such an extent that the animal hitched to the implement cannot move it. It has also been found that the use of such ploughs leave the roots of weeds uncut in the ground and shallow ploughing has the effect in time of making the soil sterile. In such cases the growing of deep root plants, such as beetroots and potatoes, is made difficult. Such ploughs also require an excess of manual labor, slowing down cultivation and ultimately causing over-population in the villages. The slow progress of agriculture among the Han race after hundreds of years in tilling soil may be attributed directly to such inefficient farming tools.

The sowing of mixed seeds with resultant mixed crops harvested with shells and dust included, as well as losses due to weeds denote clearly a general inefficiency of existing agricultural methods. This forces the conclusion that these present day methods should be changed. It is noteworthy that under such methods cultivated areas never were extended and no systematic methods were followed in the allotment of farm areas to accord with the nature of crops. Furthermore, irrigation, drainage and manuring were details carried out by hit-and-miss fashion just as these ancient tillers of the soil feed their cows, ponies, dogs and sheep all alike.

The simplicity of the farming tools used by these people and their unsystematized methods of farming while yielding poor results still made them chary of experiments that might lead to expansion and changes in their work from year to year.

It is being strongly urged upon new Japanese settlers in the land that their aim should be to produce the best crops possible from the ground and that they should be careful to see that their villages are devoid of the social defects so common among the old settlers. To attain the best results the necessity is pointed out of using foreign mechanized methods of farming, but it is added that these methods should be modified to accord with the surroundings in which they are employed. These new settlers will find that such modification of their mechanical tools will be necessary because these tools cannot at once be utilized in Manchuria precisely as they are used in Europe and in America. Here the racial Japanese mechanical cleverness of adapting foreign tools to new uses must find full scope.

In other words, a new mechanized agricultural system will have to be created to best suit the needs of the place where it will be applied. Past experiences have disclosed that foreign agricultural methods cannot successfully be transplanted and employed in their original form to Manchurian soil.

Synthetic Chemical Plant

Following lately acquired financial support from Kanagafuchi interests, the Japan Gosei (Synthetic) Chemical Industry Company, as part of a three-year extension program, is erecting a large synthetic chemical plant on a 100,000-*tsubo* (one *tsubo* equalling 35.583 sq. ft.) site at Udo, Kumamoto Prefecture, Kyushu. The initial stage of construction work on the new plant is scheduled to be finished by spring of 1940.

The output of the completed plant will include synthetic butanol, acetone, piny resin and other products of the carbide induction industry. Advance of the company into an expanded field of chemical production is considered probable due to the fact that Kanagafuchi interests are expected to extend considerable financial aid to the chemical concern in order to gain further control over the chemical industry in Japan.

The U.S. Improves its Position in the Philippine Market

Based on Reports of the American Trade Commissioner, Manila

IN every year but four since 1917, the United States has held from 60 to 65 per cent of the import trade of the Philippine Islands and in 1938 the American share climbed to 68 per cent, or the greatest in the history of trade between the two countries. Imports of American goods, valued at 180,714,000 pesos, were the highest since 1929, and advanced 42.5 per cent, compared with 1937.

Conspicuous Gain in Textile Market

Contributing very materially to this improved position were increased sales of American cotton piece goods in the Philippine market. Even before the close of 1937, Chinese importers and retailers, who predominate in the textile business, were ordering from American manufacturers types of textiles not sold in the islands for years. Textile importing was exceedingly active throughout 1938, and imports from the United States of 81,159,000 square meters, valued at 20,036,000 pesos, increased on a volume basis 178 per cent compared with 1937 (One square meter equals 1.196 square yards; one peso equals \$0.50). Other cotton manufacturers from the United States, notably clothing and thread, also increased substantially.

According to Philippine customs figures, American cotton cloths supplied 62 per cent of the total Philippine demand, against 29 per cent in 1937. Imports from Japan, on the other hand, accounted for 28 per cent of the total trade, compared with 50 per cent the previous year. Amounting to 36,966,000 square meters, Japanese cotton cloth imports declined 26 per cent. Ordering of American textiles has continued active during the current year, and recent reports indicate that very heavy stocks have accumulated.

General Trade Improvement

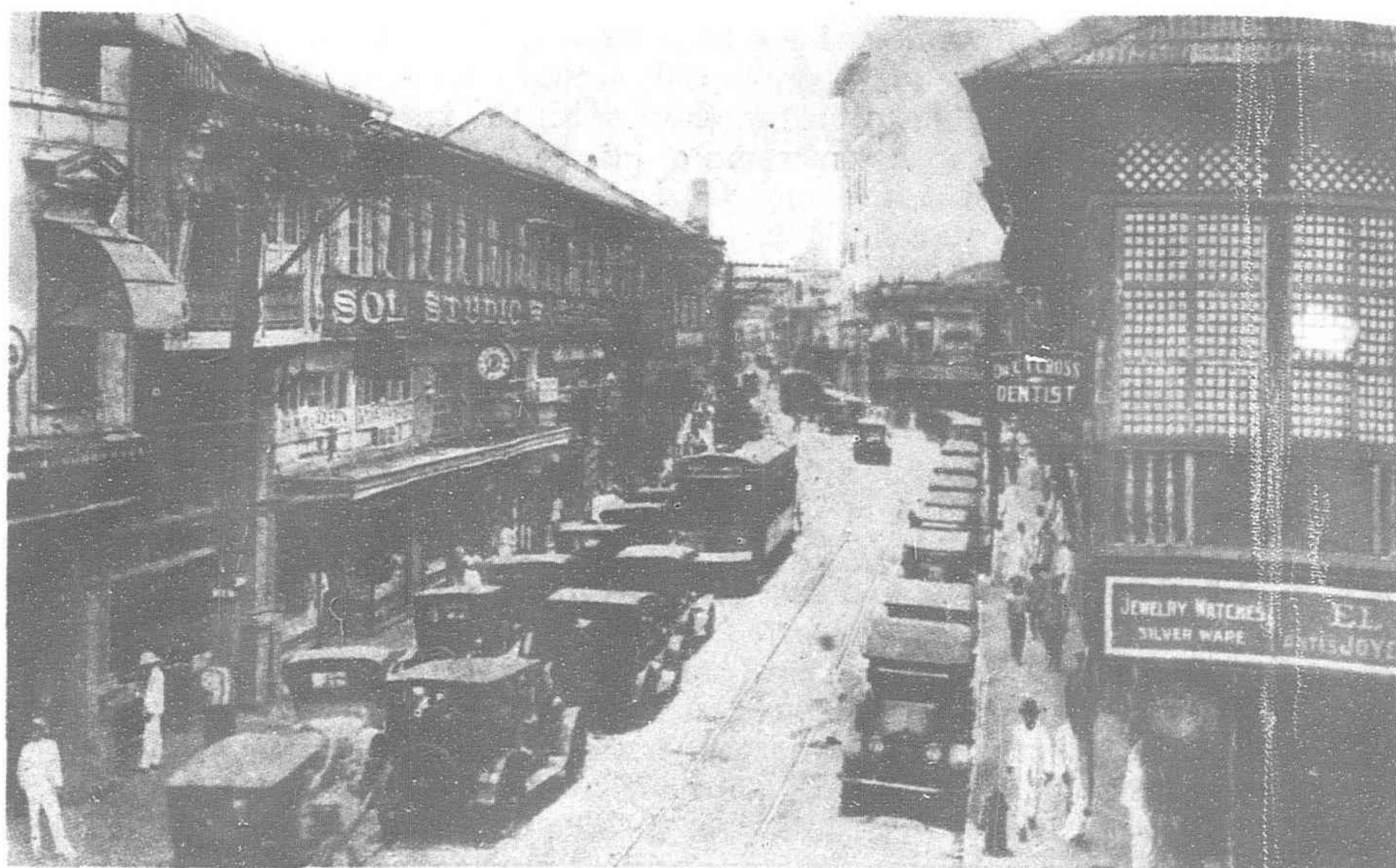
Not alone, however, in the textile market has Philippine demand for American products shown recent improvement. Exporters in the United States appear to have been the principal beneficiaries of more active Philippine buying from abroad in 1938. Total Philippine imports of machinery advanced 29 per cent, while imports from the United States, valued at 16,314,000 pesos, increased 34 per cent. Against a gain of 11 per cent in total imports of iron and steel goods, sales of American products increased 26 per cent, totalling 20,114,000 pesos. Greater mining activity, industrial expansion on the part of the National Development Company, and increased building and construction by both Government and private enterprises were responsible for the improved trade in machinery and allied products.

Although purchasing power in agricultural areas was curtailed because of low prices for Philippine export produce, sales of automotive products held up well in the Manila district, and imports from the United States, which amounted to 13,750,000 pesos, increased 34 per cent.

Philippine trade in petroleum products advanced 25 per cent, with imports from the United States valued at 12,308,000 pesos, showing a corresponding gain. Owing to restricted use of illuminating oil in agricultural districts, the gains were in classifications other than kerosene. Normally most of the crude fuel oil used in the Islands comes from the Netherlands Indies, but shipments from the United States increased materially, probably because of sales to the mines.

Flour Sales Establish Record

Imports of American flour established a record in 1938 and, amounting to 6,510,000 pesos, more than doubled the 1937 value.



Escolta street, one of Manila's busiest thoroughfares

Imports from Australia and Canada, the principal competing countries, were lower. General scarcity and high prices of rice, in contrast to low prices for flour, were largely responsible for increased demand. Reports received so far this year show that consumption is holding up well and that further heavy orders for American flour have been placed.

Notwithstanding continued competition from the Netherlands, imports of canned milk from the United States improved 30 per cent. Less severe competition from Japan was noticeable in the canned fish market, and purchases from the United States increased 45 per cent. The trade in canned sardines alone more than doubled. Popularity of American cigarettes continues unabated, and imports, valued at 13,730,000 pesos in 1938, increased over 100 per cent in both value and volume.

Philippine trade with the United States also showed noteworthy improvement last year in such products as paints and varnishes—buying of which was actively sustained by both Government and private enterprises—pharmaceuticals, perfumery and cosmetics, soaps, radios and other electrical goods, fresh fruits, rubber tires, leather and manufactures, paper products, rayon cloth, and wood and manufactures.

Lower Agricultural Prices

Lower prices of Philippine agricultural products were very largely responsible for a decline of 35 per cent in exports to the American market, which, excluding gold, were valued at 178,890,000 pesos, compared with 241,485,000 in 1937.

Sugar and coconut products together account for around 80 per cent of Philippine exports to the United States, with sugar comprising 53 per cent and coconut products 26 in 1938. Under quota regulations the volume of sugar shipments was substantially the same as in 1937, but the value declined from 115,221,000 to 100,005,000 pesos.

Exports to the United States of coconut products were valued at 46,110,000 pesos, compared with nearly 85,000,000 in 1937. Greater competition in the American market from animal fats contributed to the drastic reduction in price. All classifications declined materially in value, especially copra and coconut oil, but shipments of the former were heavier and of the latter only very slightly under the 1937 volume.

With all three leading markets for abaca—the United Kingdom, the United States, and Japan—taking considerably less of the fiber, production fell off materially and prices reached all-time lows. Shipments to the United States were about 30 per cent less in volume and, valued at 4,863,000 pesos, 65 per cent lower in value than in 1937. Reports for 1939 indicate materially accelerated demand in all markets.

Conspicuous for an increase in value were exports to the United States of embroideries, which advanced from 7,123,000 to 10,047,000 pesos in value.

(Continued on page 346)

Osaka's Subway System

New Section of Underground Railway Said to be Least Noisy

By W. HARVEY CLARKE, Jr.

AMONG underground electric railways in any country, the Municipal Highspeed Subway being constructed in Osaka is claimed by Chief Engineer Yoshiyuki Hashimoto, of the city's Railway Construction Bureau, to be the least noisy for passengers riding in its 45-ton steel coaches. Plans are gradually being realized in Japan's leading industrial and commercial center for a converging 4-route, sub-surface and suburban-elevated rapid transit system to extend for a combined distance of 54.89 kilometers, of which 7.2 kilometers of double-track subway between the Umeda and Tennoji stations has been operated since April, 1938. Connecting eight underground stations and traversing the central part of the city, this stretch completes a third of the 21 kilometers of subway included in the first stage of construction now under way.

In measuring the comparative sound intensity inside the speeding coaches of the Osaka Subway with a given acoustic sensation level of 95 decibels for New York City's subways and 85 to 90 decibels for Tokyo's two underground lines, only 65 decibel units of normally audible sound is recorded within any of the 28 coaches in regular service. This appreciable reduction of constant noise resulting from rapid train movement through an underground passage has been accomplished by:

- (1) Eliminating any unnecessarily exposed steel and iron material from side wall, septum, center post and ceiling surfaces of the tunnel,
- (2) Setting as far apart as practicable, at intervals of four to five meters, the line of ferro-concrete center posts separating most of the two right-of-ways in the subway structure,
- (3) Arresting the excess vibration and swaying motion of cars by 4-piece, fusion thermit rail welding with aluminum powder and iron oxide touched off by means of magnesium ribbons,
- (4) Lessening the usual space between wooden crossties by increasing their number and laying them closer together,
- (5) Ballasting trackbeds with finer than ordinary crushed rock, and restricting to station limits concrete rail sleepers and ballast, and by

- (6) Equipping all truck wheels and gear mountings with special leaden silencer appliances.

Having a population at present fast approaching the three and a half million mark, Osaka's 187 sq. kilometers of incorporated territory bordering a landlocked bayfront to the south-west, reaches out northeastwardly onto the plain of Settsu and is bounded respectively by the Kanzaki and the Yamato rivers on the north and south. Intersecting the city in all directions numerous rivers and canals, including the Shin-Yodo, Yodo, Dojima, Aji, Kitsu, Shirinashi and the Nakatsu rivers, and the Tosa and Naga canals, form an intricate network of waterways. Literally thousands of various type bridges, many known for architectural symmetry, span these watercourses.

In addition to ten interurban electric and five government railway lines radiating from the city's central districts, a total of 104 kilometers (about 65 miles) of municipal trolley lines, the first stretches of trackage for which were laid 36 years ago, in 1903, criss-cross the city and carry more than 300,000,000 passengers annually.

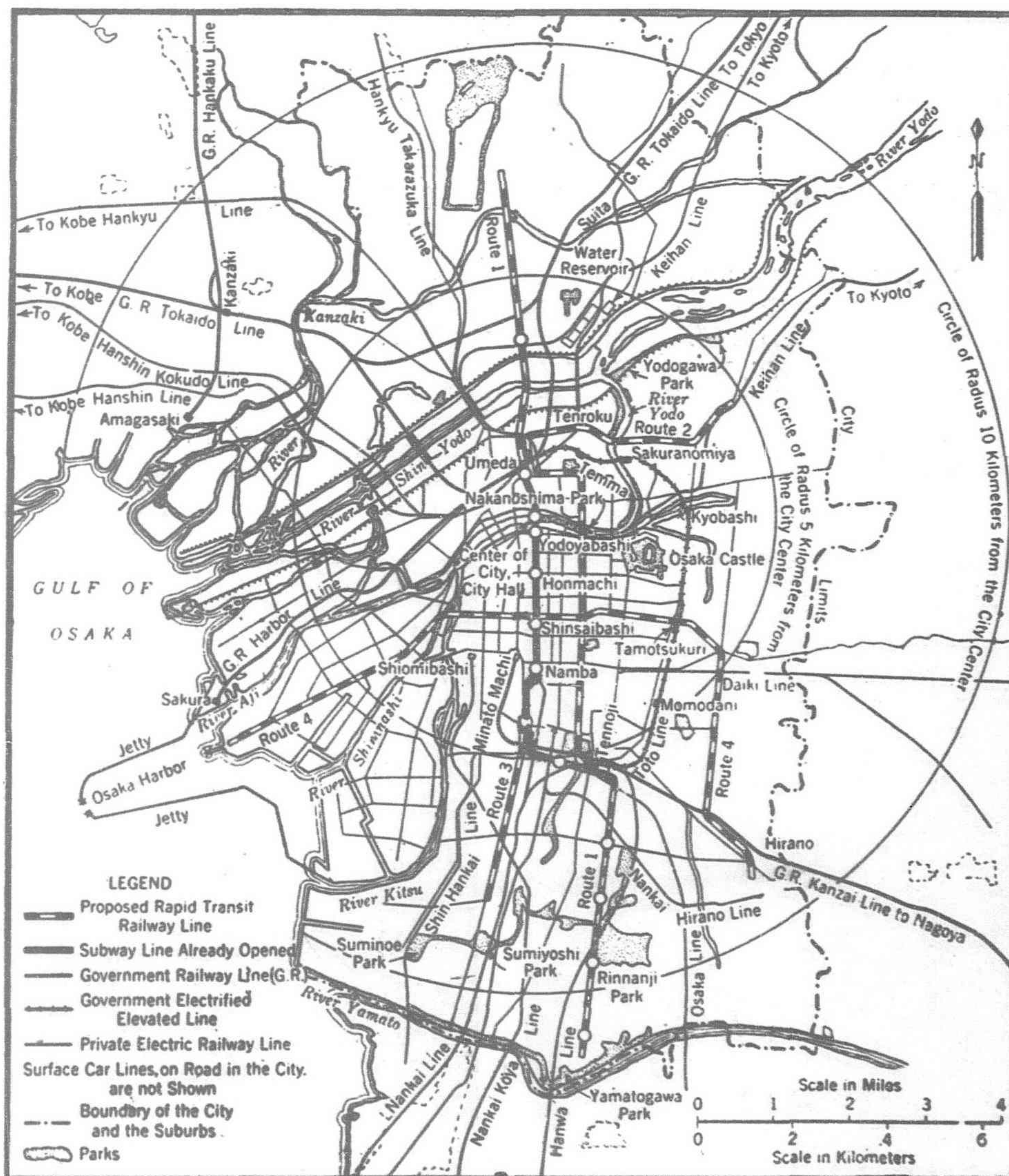
With the pressure of population in the metropolitan area mounting year by year, Osaka's standing municipal investigation committee, a score of years ago, foresaw the impending need and necessity for a rapid transit system having facilities and capacity

adequate to meet the demands of speedier transportation in a growing city. Early in the 1920's this committee completed a survey of requirements based upon the city planning program and proceeded to draft a working plan for four connecting highspeed lines, with subways radiating from the central part of the city and elevated right-of-ways in suburban areas. The project was approved by the government in March, 1926, after being accepted as feasible by the Imperial Railway Society and the Civil Engineering Association.

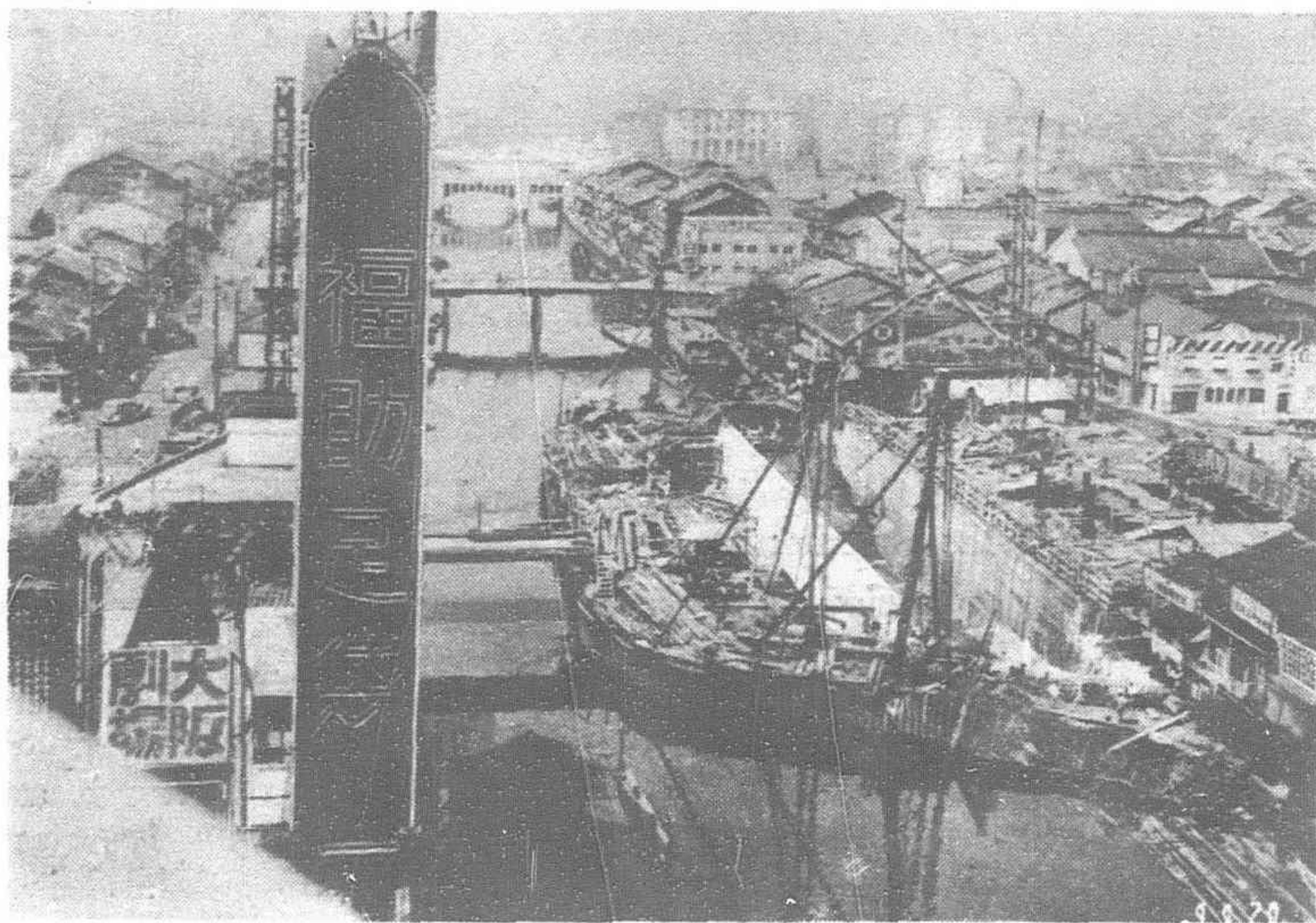
Four key routes have been laid out to serve localities where they are most needed, as indicated below:

Route 1.—from Enokizaka, Oaza, at Toyotsugori, to Abikomachi, Sumiyoshi Ward, a distance of 19.95 kilometers.

Route 2.—from Morikojimachi, Asahi Ward, to the Tennoji Station of the Government Railways, a distance of 13.7 kilometers.



Sketch map of the city of Osaka, showing transportation facilities



Subway construction progressing alongside the Dotonbori, where cofferdams were erected to hold back canal water while tunnel was being completed, September 20, 1934

Route 3.—from the Okunimachi crossing of the municipal trolley line, Naniwa Ward, to Tatsumidori 2-chome, Nishinari Ward, a distance of 4.14 kilometers.

Route 4.—from the docks in Minato Ward to Nishiwakimachi, Hirano, Sumiyoshi Ward, a distance of 17.1 kilometers.

The combined length of the above four lines is 54.89 kilometers. Total construction costs were provisionally estimated at approximately Y162,300,000 to be derived chiefly from the flotation of municipal bonds.

In January, 1930, the initial stage of construction work was begun at the Umeda Station site on Route 1, which, with Route 3, traverses in almost a straight line a course of 20.36 kilometers through the busiest downtown sections of Osaka.

First Stage of Construction

(a) Length of lines :

Part of Route 1 ... from Nishimachi, Higashiyodogawa Ward, to Abikomachi, Sumiyoshi Ward, a distance of 16.22 kilometers.

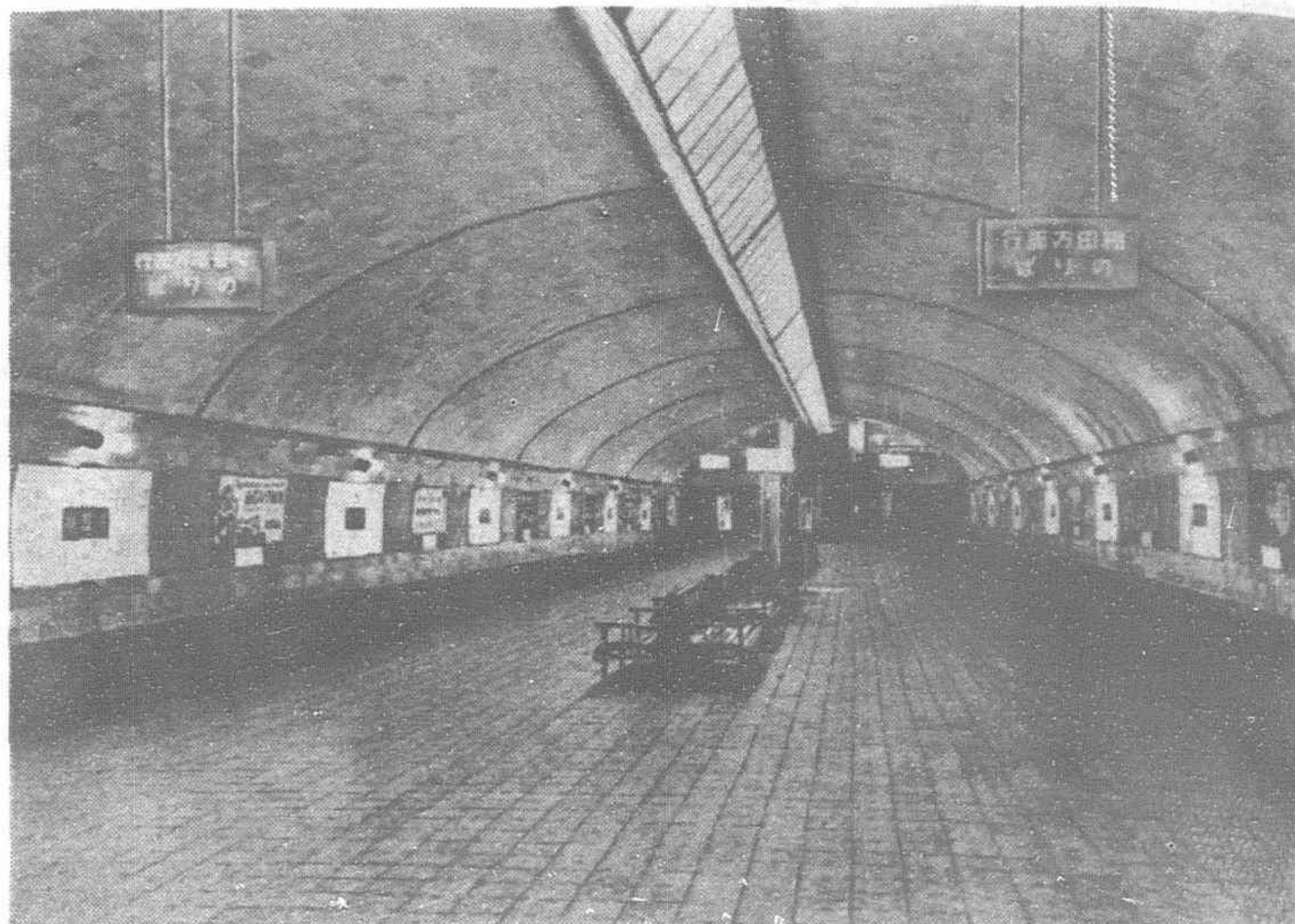
Route 3 ... from Okunimachi, Naniwa Ward, to Tatsumicho, Nishinari Ward, a distance of 4.14 kilometers.

(b) Estimated outlay of funds :

Total ... Y107,675,275



Umeda station's nine-meter wide island platform, also 180-meter long, showing typical stairway and an ascending escalator, as is provided at both ends of the Umeda, Shinsaibashi, Namba, Dobutsuen-mae and Tennoji stations, October 16, 1937



Yodoyabashi Station's 180-meter long (600 feet), and nine-meter wide (29½ feet) island platform under arched roof

Including—Y83,299,047 for construction, Y23,826,228 for payments of principal and interest on municipal bonds during the period of construction, and Y550,000 as a reserve fund to cover unforeseen expenditures.

(c) Sources of revenue :

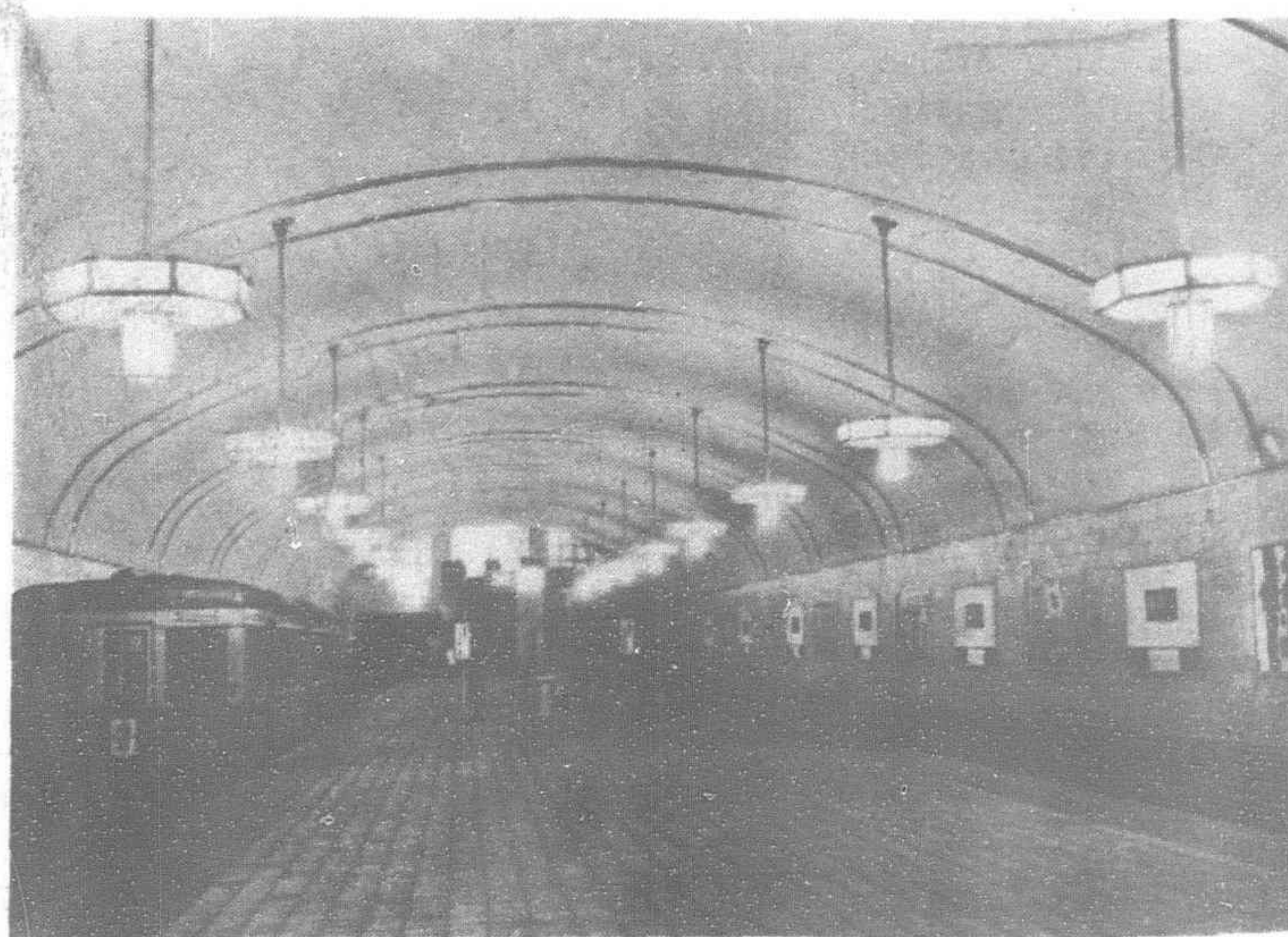
Total ... Y107,675,275

Including—Y97,651,911 from municipal bonds, Y3,740,624 to be borne by those to be benefited directly by the subway lines, Y5,742,084 from estimated profits accruing from subway operation, and Y540,656 from other sources of revenue.

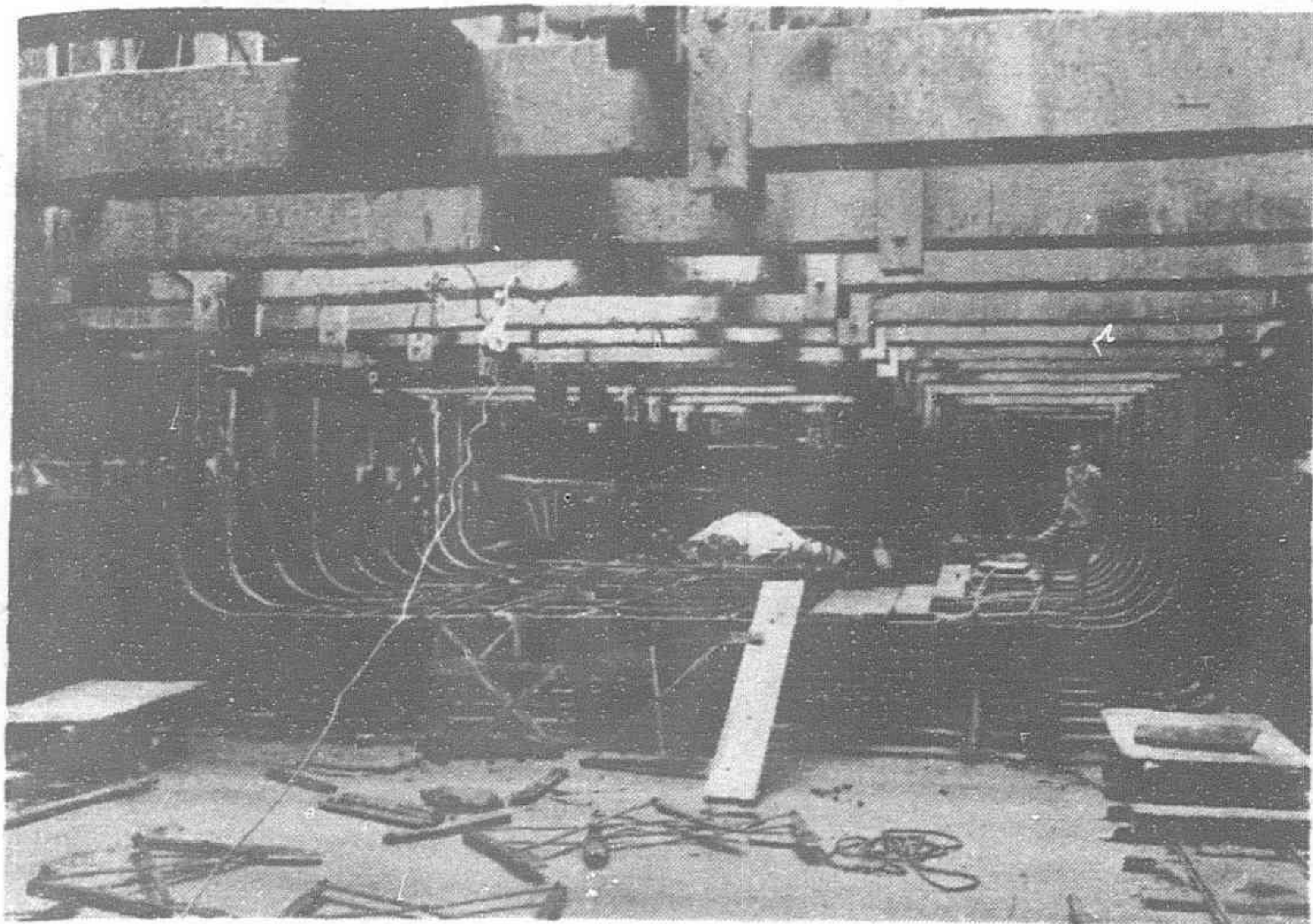
(d) Term of duration for the first stage of construction :

Work undertaken as a 15-year extension program extending over the period from 1929 to 1943.

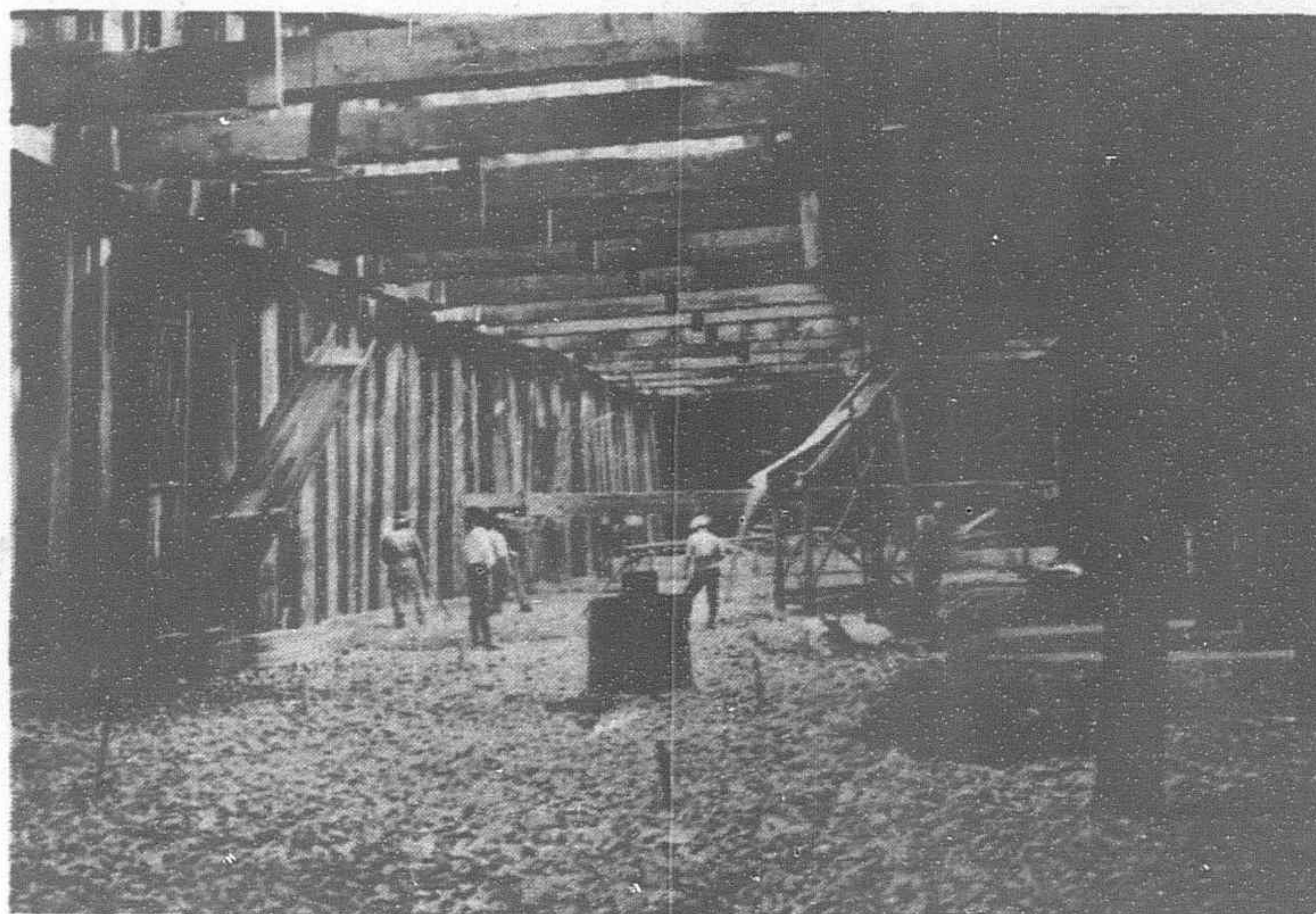
Early construction progress on Route 1 was difficult due to weakness of the earth structure between the Umeda and Yodoyabashi stations. Excavation here included underwater tunnel driving beneath the Dojima River and the Tosa Canal. The three kilometers (1.9 miles) from Umeda to Shinsaibashi was opened to traffic on May 20, 1933, and the stretch between Shinsaibashi and Namba was finished in October, 1935, bringing the total distance operated up to 4.2 kilometers (about 2.6 miles). With work



Island platform with semi-circularly arched roof at the Shinsaibashi station, showing one of the 28 steel coaches in service between the present Umeda and Tennoji terminals, December 4, 1934



Constructing subway with steel framework under the waterway flanking the Osaka city hall, January 16, 1931



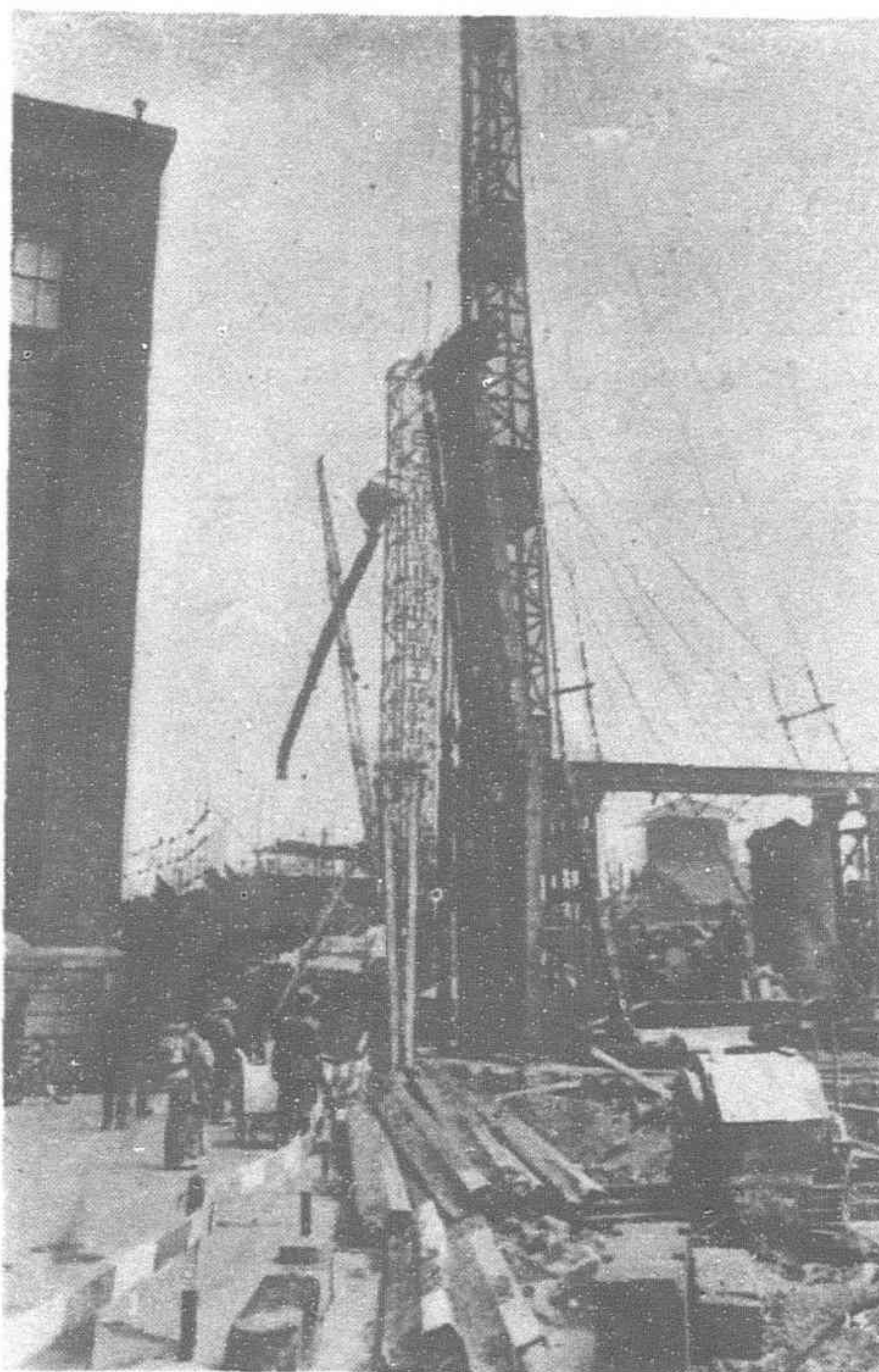
Excavation near Honmachi station, showing bulkheads, I-beam piles and heavy bracing, October 4, 1932

completed from Namba to Tennoji in April, 1938, the entire stretch of 7.2 kilometers from Umeda to Tennoji was put into operation.

At present construction is going ahead for Route 1 along a 500-meter course south of the Tennoji Station, and for nearly one and a half kilometers between Nishishijo and Hanazonocho on Route 3. An effort is being made to carry out future progress according to the following schedule:

Parts of Routes	Kilometers	Scheduled opening
Route 3 from Okunimachi to Hanazonocho	1.41	Sept., 1940
Route 1 from Tennoji to Nishitanabe ..	3.05	Sept., 1941
Route 3 from Hanazonocho to Tamade ..	2.73	Mar., 1943
Route 1 from Nishitanabe to Abiko ..	2.68	Sept., 1943
Route 1 from Umeda to Nampo ..	3.97	Mar., 1944

Specifications for Osaka's highspeed transit system call for double-tracking of all right-of-ways, both sub-surface and elevated. The underground portions of the system for the first-stage work reach 21 kilometers, including all of Route 3, and Route 1 from the

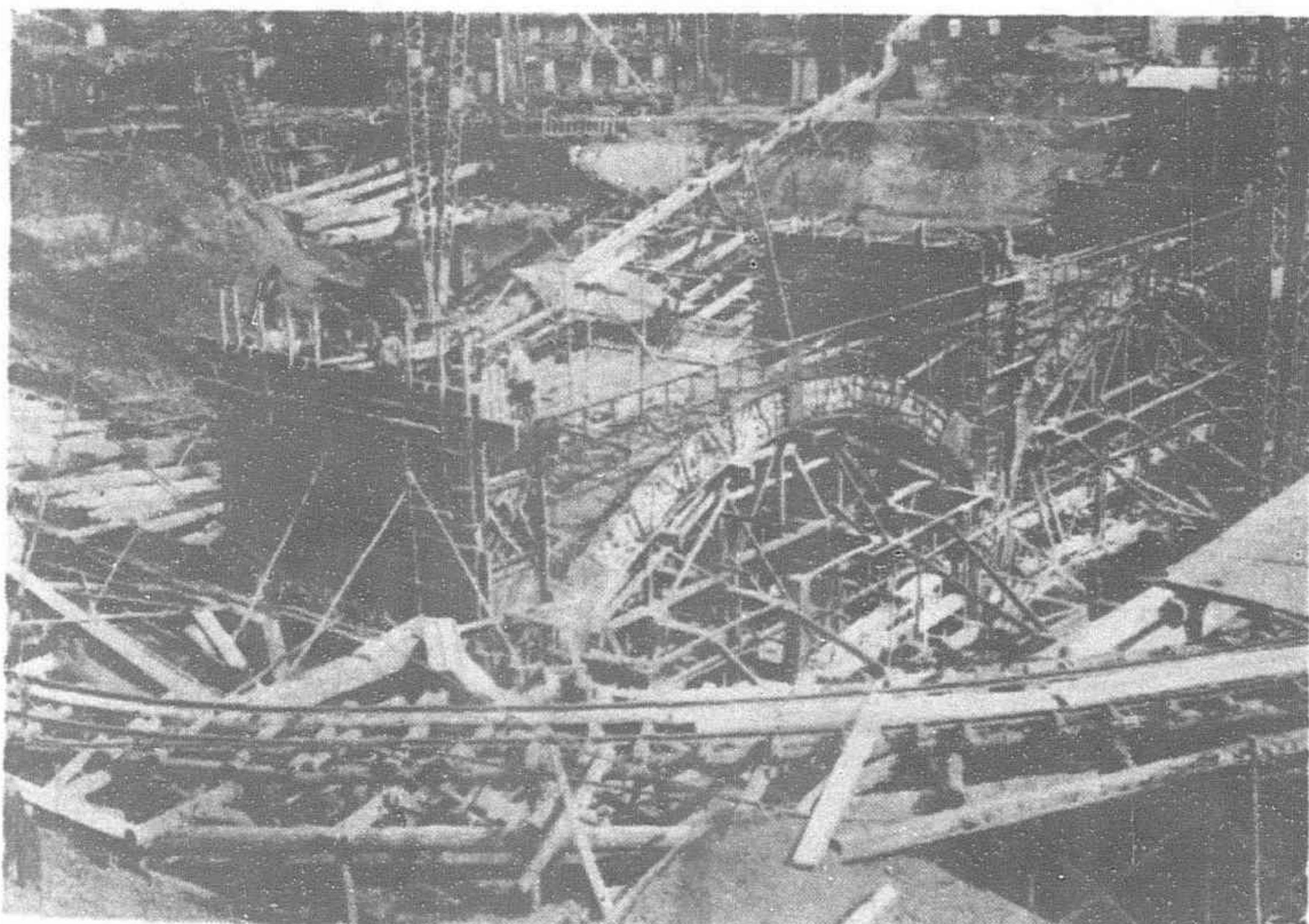


Osaka district railway building, May 6, 1939

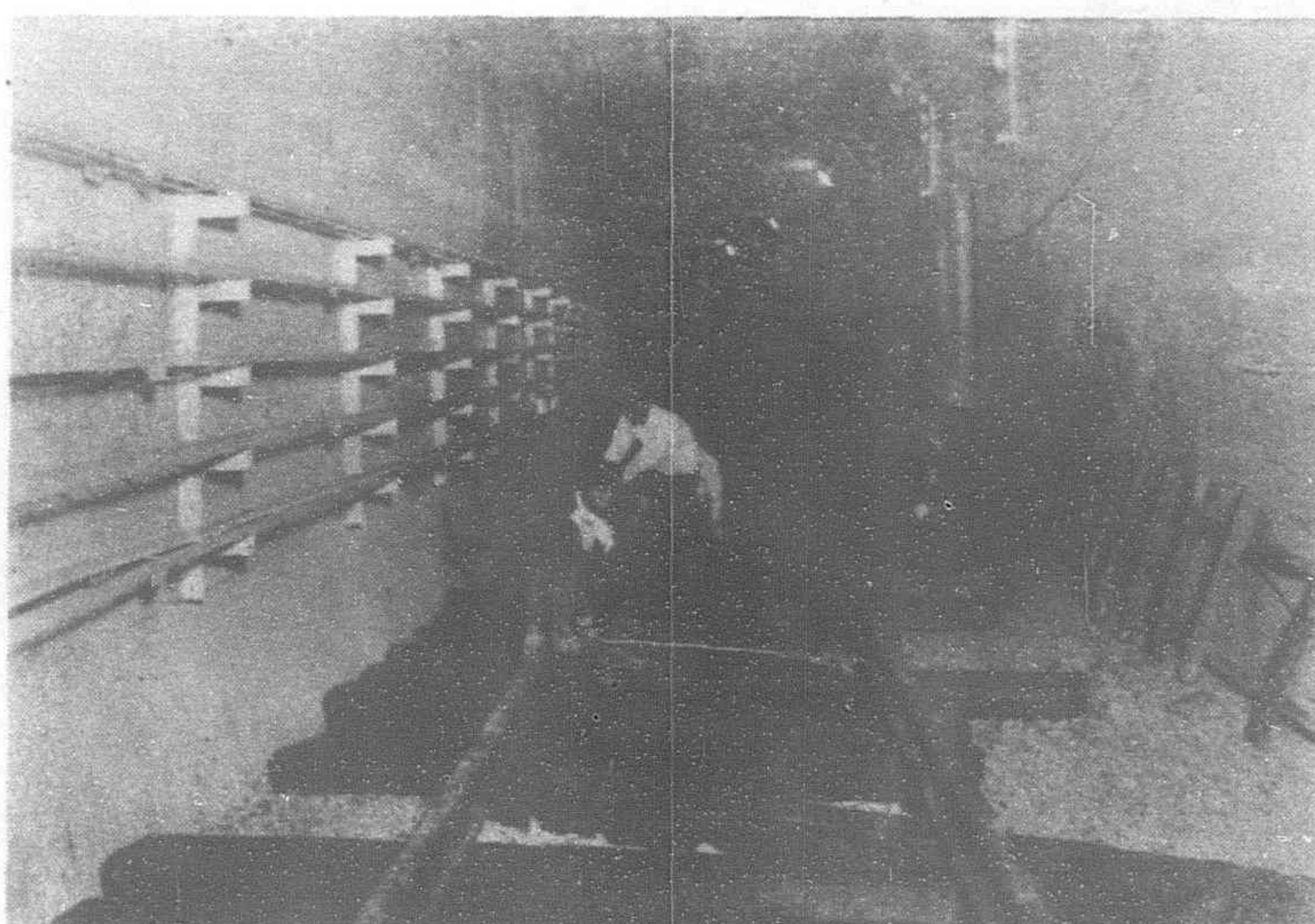
north side of the elevated depot of the Government railways to a point south of the Yodo River as far as Abikomachi, Sumiyoshi Ward. Tunnels are reinforced concrete box-shaped structures with ferro-concrete posts at four to five meter intervals separating the two track-beds. Semi-circularly arched subway structures have been erected for station sections and at a few other places.

The elevated right-of-way will extend for 18.8 kilometers on Route 1, from its southern terminus to the Government Railway freight depot on the south side of the Yodo River. Elevated structures will stand on a reinforced concrete base with single-column supports ten meters apart. The track-bed will be 9.1 meters wide, and the clearance from the ground surface about 6.9 meters.

Route 1 when completed, will have a total of thirteen underground stations, and Route 3, three stations, as follows: Nakatsu, Umeda, Yodoyabashi, Honmachi, Shinsaibashi, Namba, Okunimachi Dobutsuen-mae, Tennoji, Abeno, Tanabe, Nagai and Abiko; and Hanazonocho, Saraike and Tamade. Some of the stations where required are formed of iron framework besides reinforced



Excavation showing a twin-arch tunnel structure being built in front of the Osaka central railway station for the Umeda station, where subway routes 1 and 2 converge, February 21, 1931



Fifteen-meter, 100 lb. per yd. rails being laid across creosoted wood ties on one side of double-track tunnel, with ferro-concrete partition wall on right, January 27, 1933

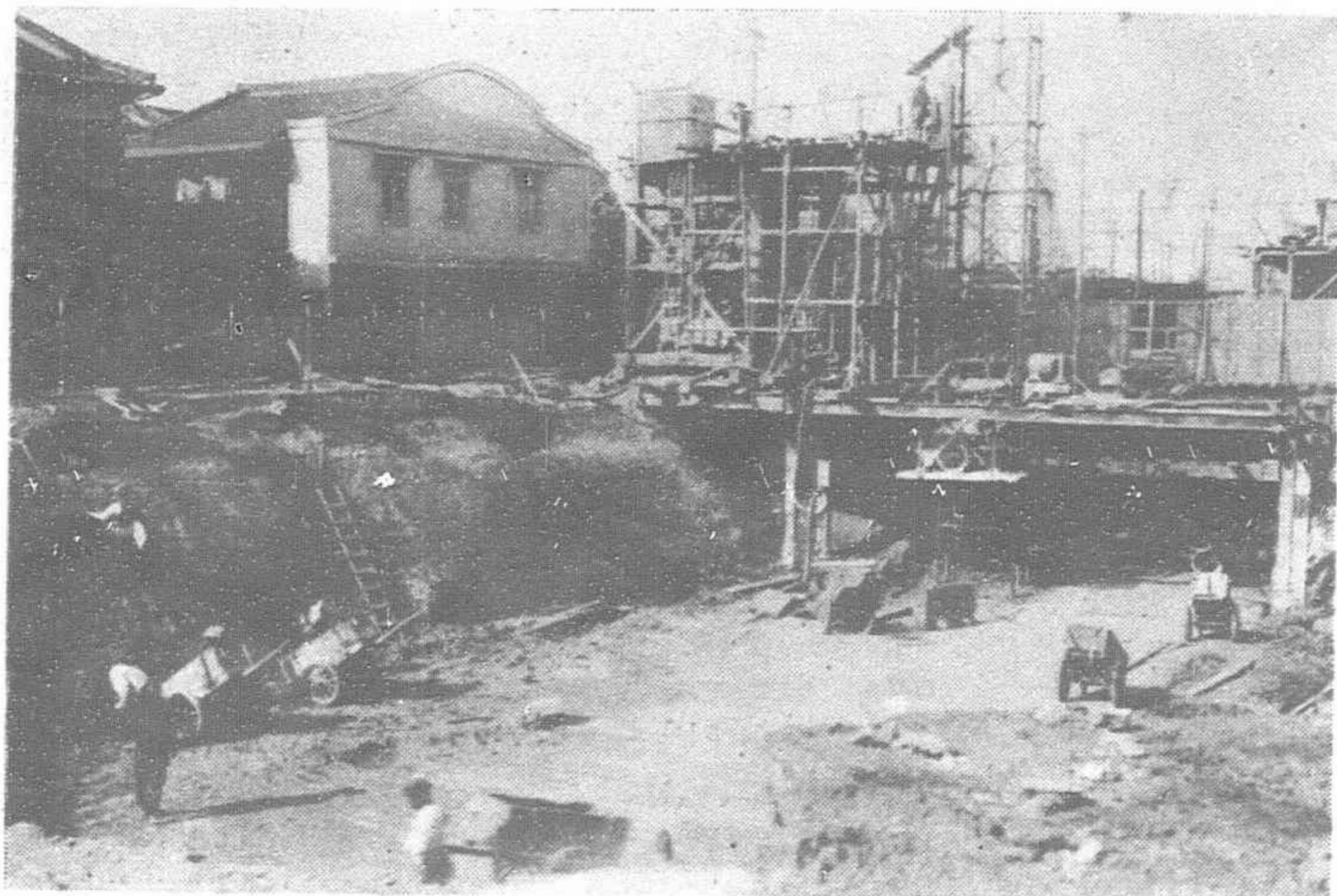
concrete. Because of their depth, escalators are provided, in addition to stairways, at the Umeda, Yodoyabashi, Shinsaibashi, Namba and Tennoji stations. Sub-surface connections are provided at Umeda, Shinsaibashi, Namba, Dobutsuen-mae and Tennoji to the Government Railways, department stores or interurban electric lines.

The platforms of all Route 1 stations are 180 meters long and can accommodate 10-coach trains. Those for Route 3 are 95 meters long, accommodating 5-coach trains. Island platforms are from 7.6 to 9.1 meters wide, while side platforms have a width of 3.5 meters. There will be one elevated station at the southern terminus

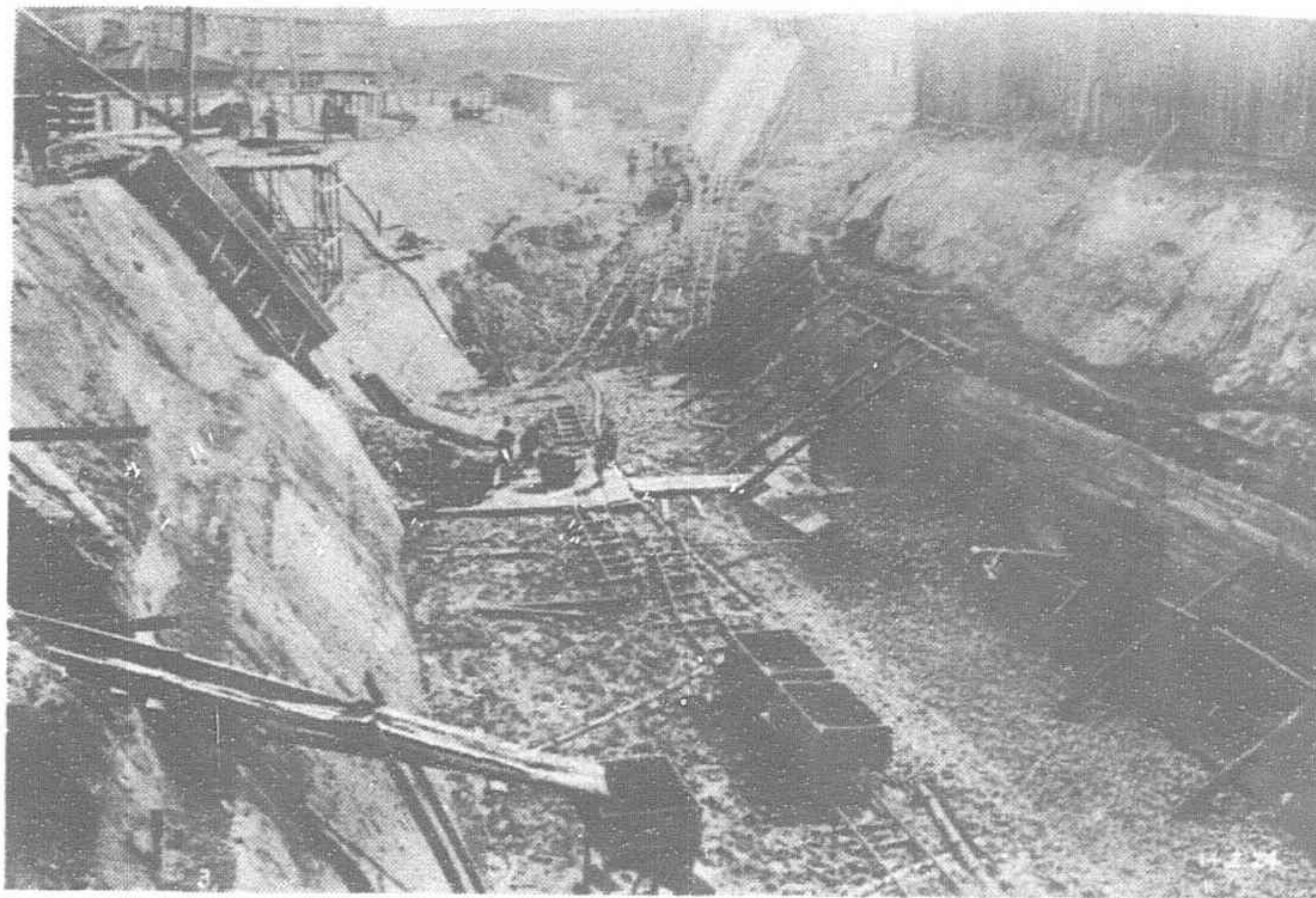
of Route 1, supported by a two to four column bridge structure capable of accommodating 10-coach trains.

Several tunnel driving methods are being used owing to the unstable character of earth formations in Osaka, compared with American and European cities where subway lines have been built. These methods are:

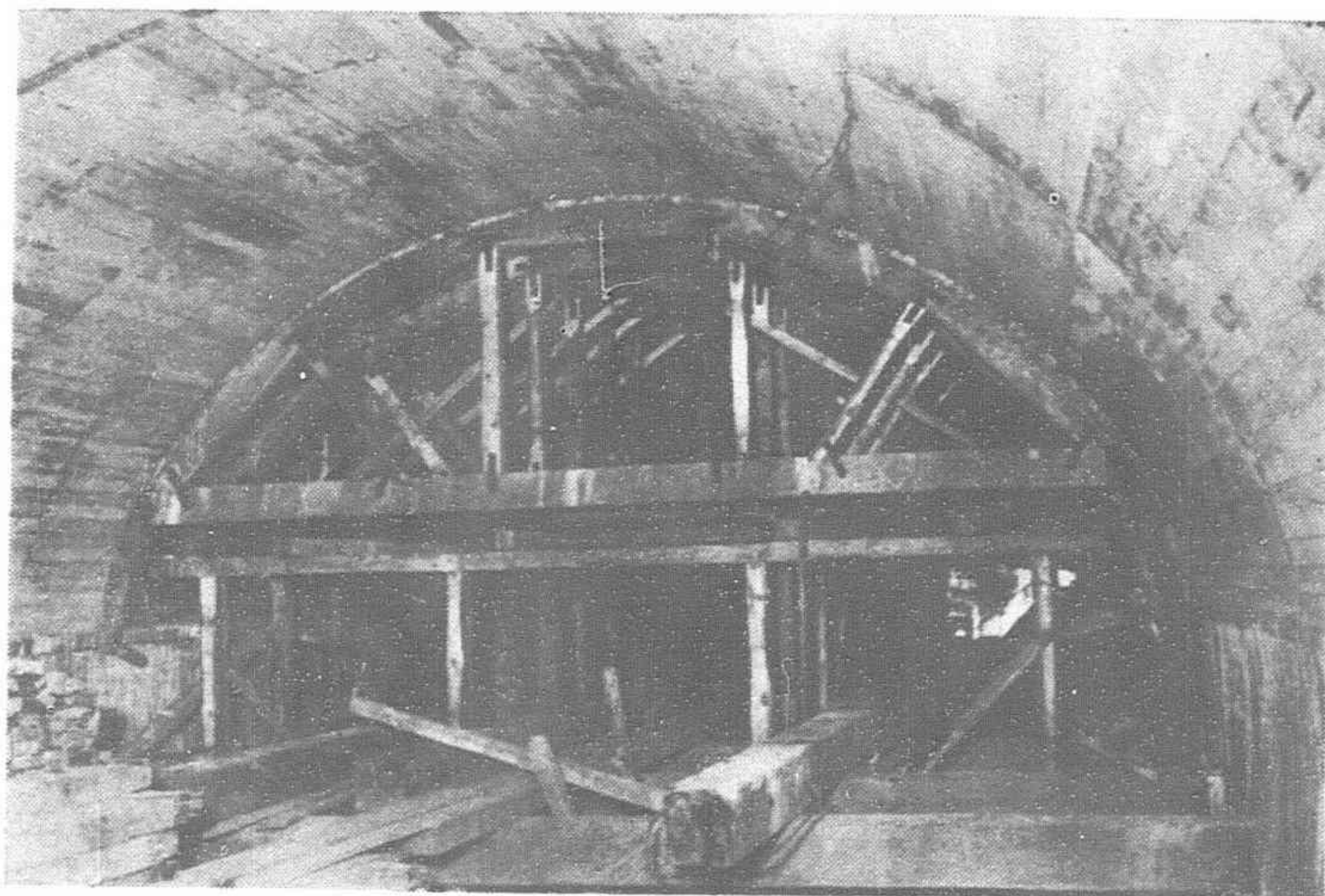
1. Box-shaped, reinforced concrete construction :
 - (a) Open-cut method (sheet steel and iron pile driving).
 - (b) Caisson sinking.
 - (c) The Ono method.
2. Arch-type concrete (non-reinforced) tunnel construction.



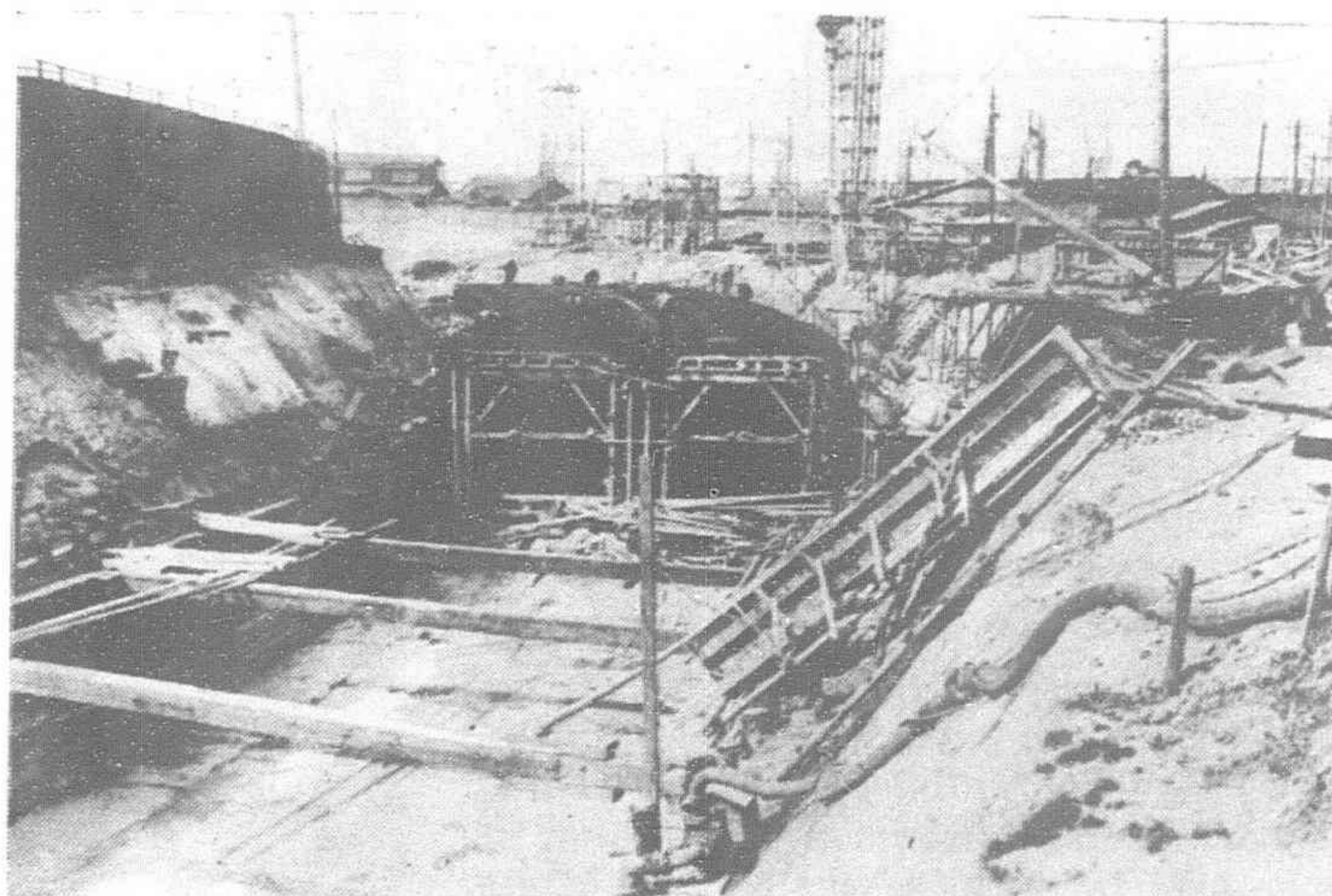
Pile driving operations under way in area excavated for subway, February 24, 1939



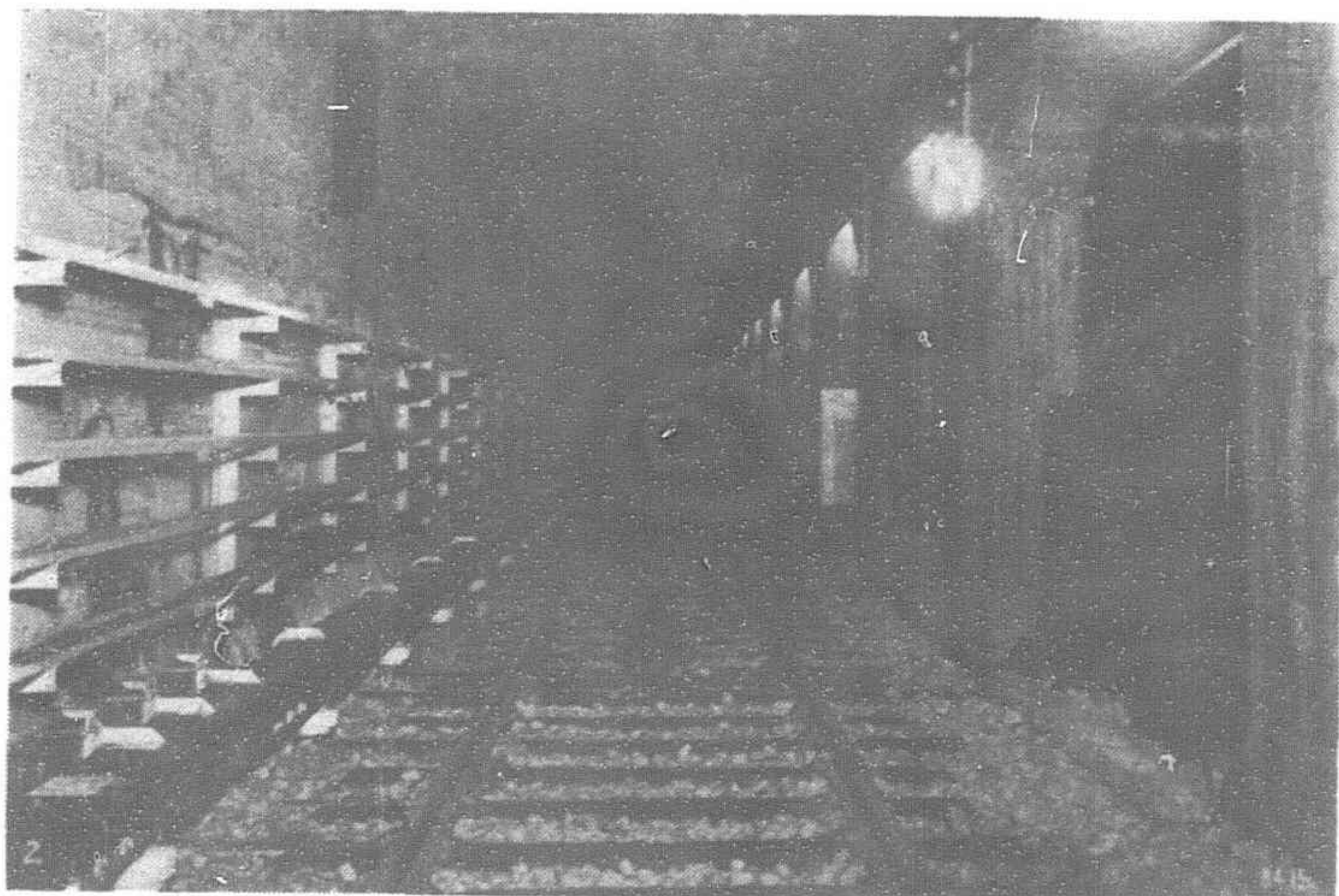
An early stage in open cut excavating for the Osaka subway, February 24, 1939



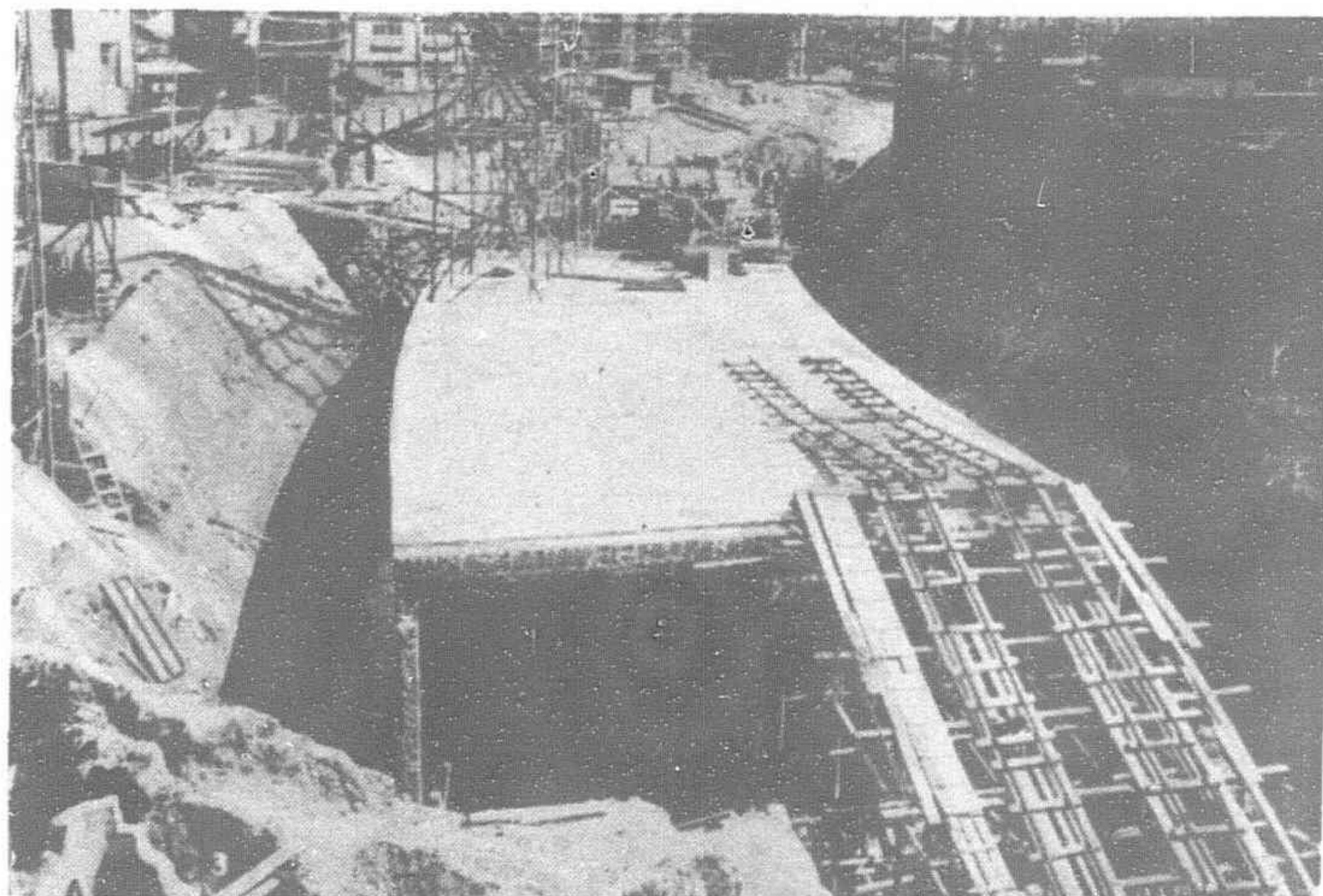
A station site where the semi-circular arched tunnel section is being lined with reinforced concrete, March 1, 1939



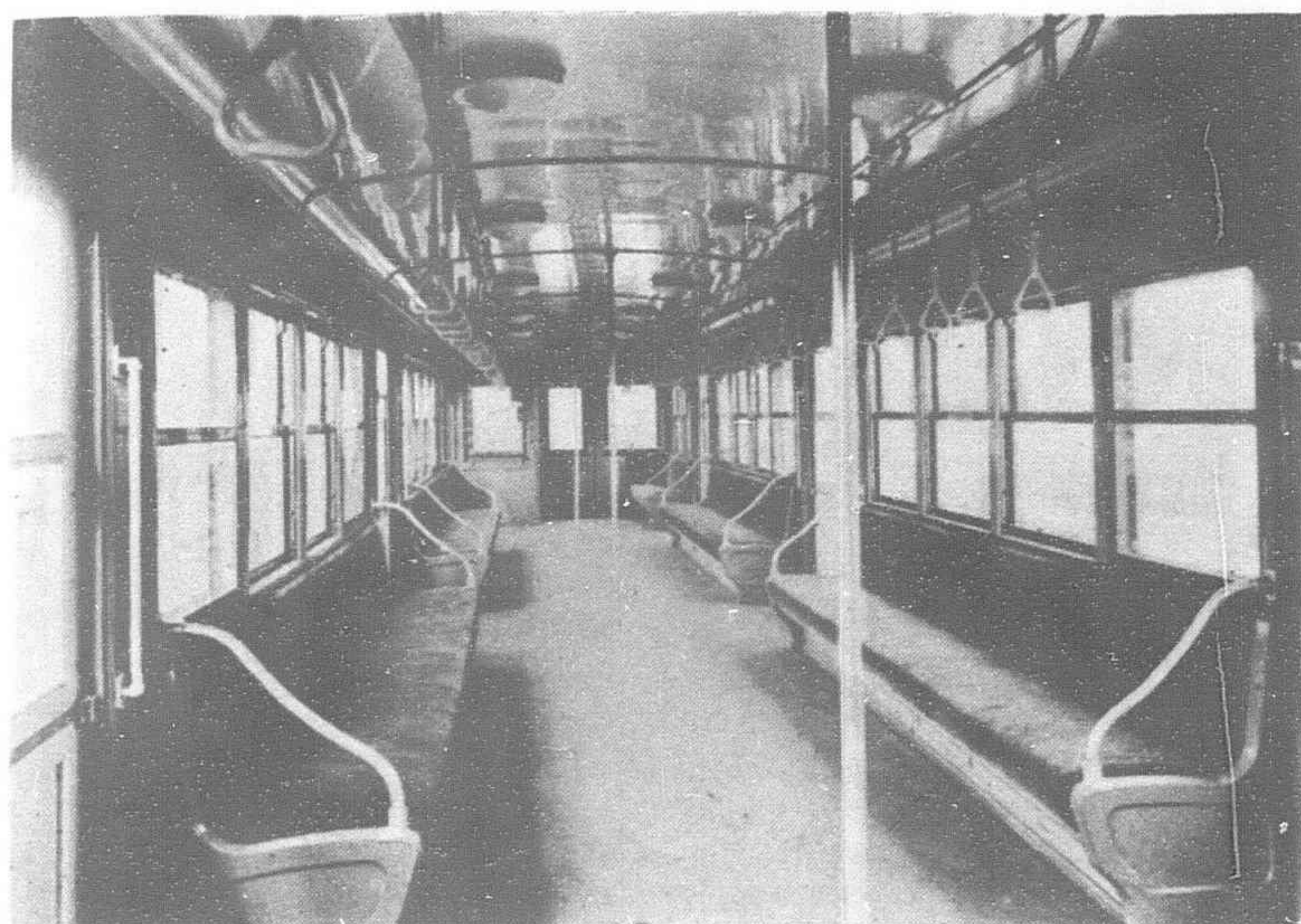
Box-shaped subway tunnel in course of construction by the open cut method, March 30, 1939



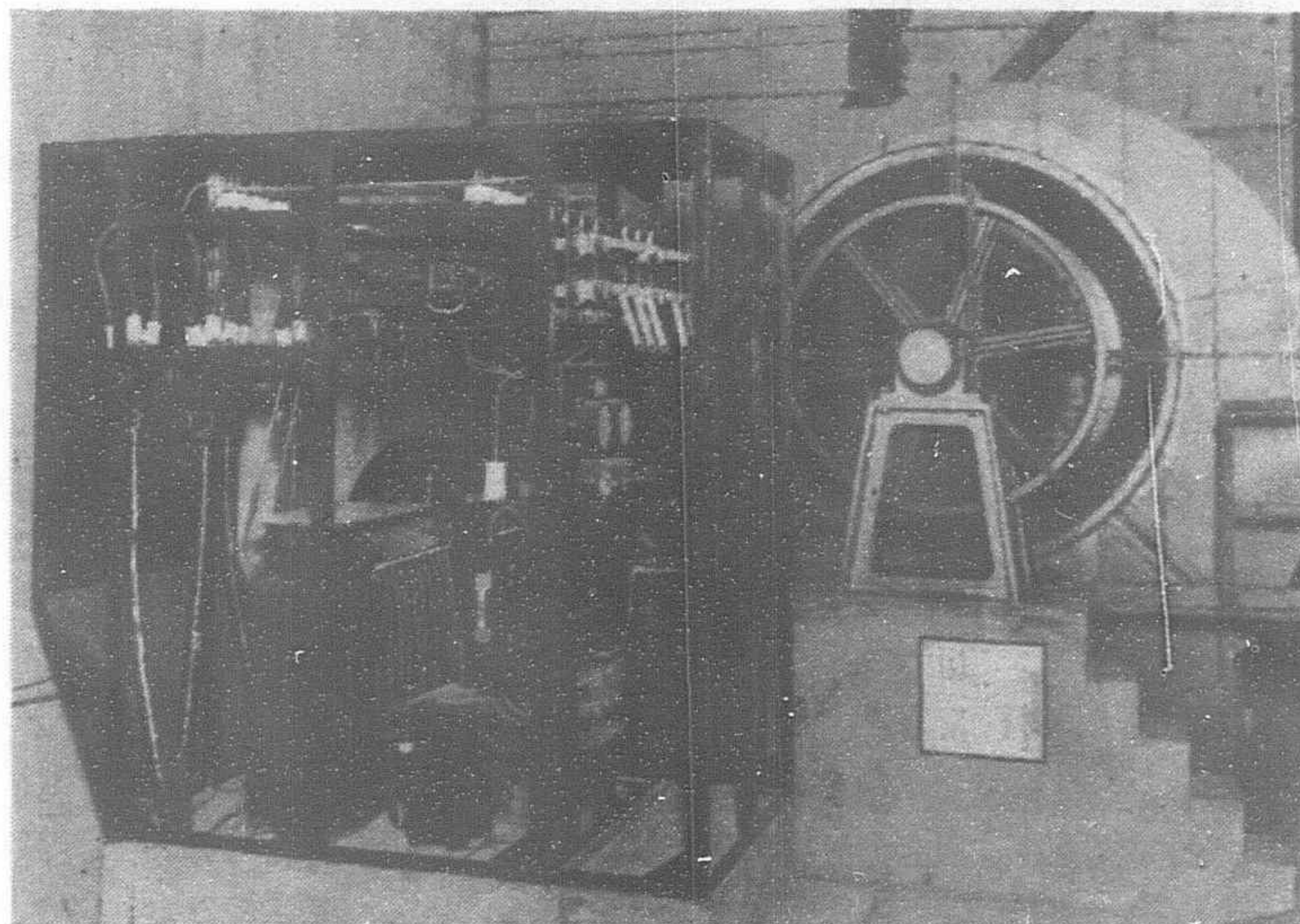
Finished stretch of subway, showing 4-ft. 8½-in. track laid on creosoted wood ties sunk in crushed rock ballast, parallel upper contact third rail and duct racks. Double tracks in the box-shaped ferro-concrete tunnel are separated by center posts four to five meters apart, April 15, 1939



Double track tunnel for subway being constructed in open cut excavation, April 28, 1939



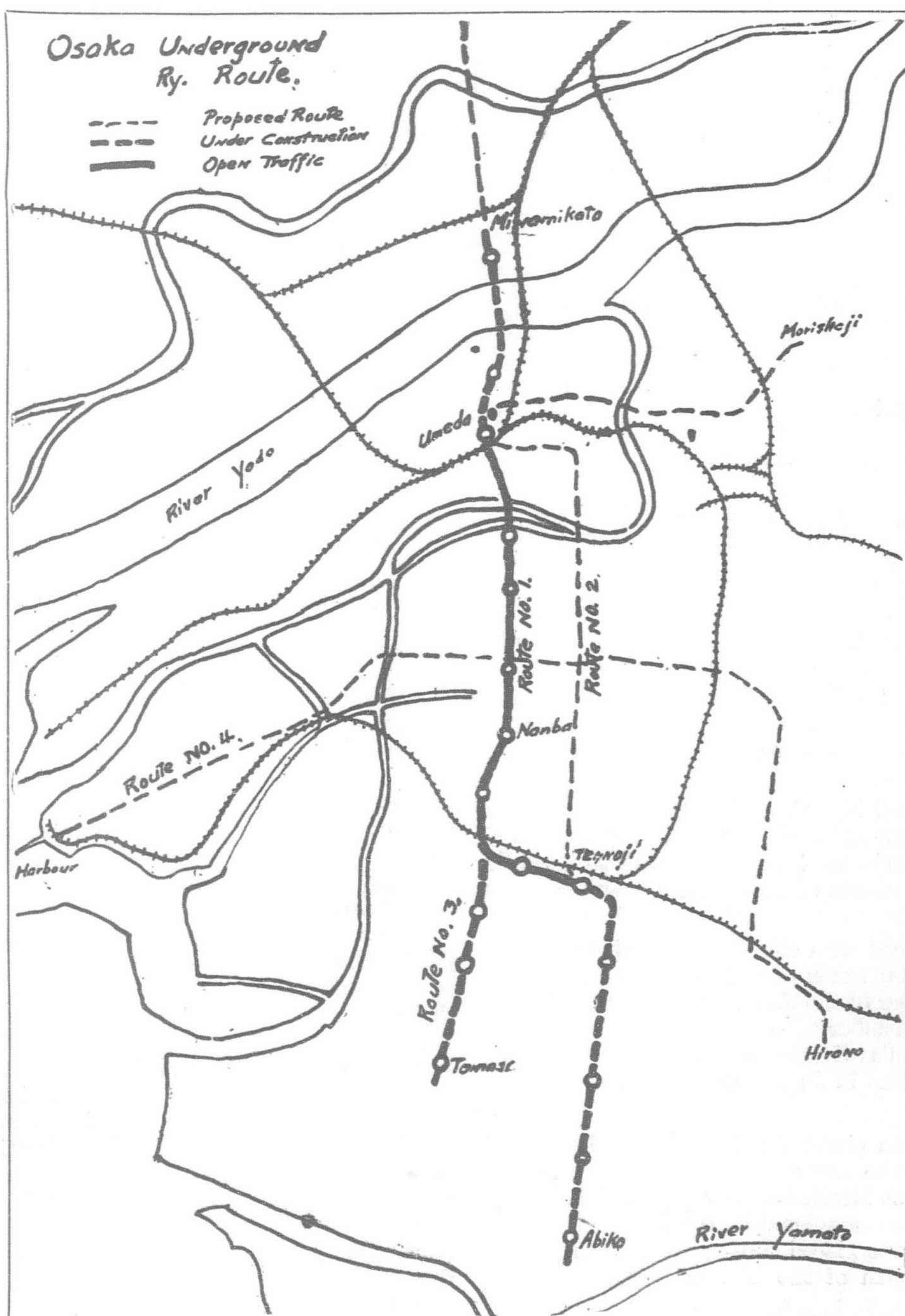
Interior of one of the Osaka subway's 45-ton steel coaches, 17.5 meters (57½-ft.) long and 2.8 meters (9¼-ft.) wide and accommodating 120 persons. These coaches have two 230 h.p. motors, electro-dynamic and air brakes, automatic couplers and pneumatically operated doors



At both ends of the eight stations now completed, as above at the Mitsudera-machi station, are exhaust and blow fans having a 200,000 cu. meter (about 7,000,000 cu. ft.) hourly capacity for ventilation. Similar fans halfway between stations are installed for emergency use. Tunnel air can be changed eight times hourly

The open-cut method is being used most frequently for excavation, while the caisson process is employed in places where underwater boring is necessary. The caisson method for subway construction has seldom been used anywhere, except in a few instances when tunnel driving under rivers was required. Use of the caisson method for a 400-meter distance, as in Osaka, is said to be the first such case on record.

Because of its short length, the first subway link of three kilometers (1.9 miles) connecting Umeda and Shinsaibashi, opened in May, 1933, did not fully demonstrate the utility of the new high-speed system. Naturally the number of passengers was small and the revenue low, there having been about 15,000 passengers daily and an intake of ¥1,300. With the opening of the Namba Station in October, 1935, the total distance was increased to 4.2 kilometers (about 2.6 miles). The Hankyu, the Takashimaya and the Daimaru department stores, as well as inter-urban line stations were served and the daily passenger average jumped to 49,000 with an accompanying revenue of ¥4,200. When the 7.2 kilometers between Umeda and Tennoji was



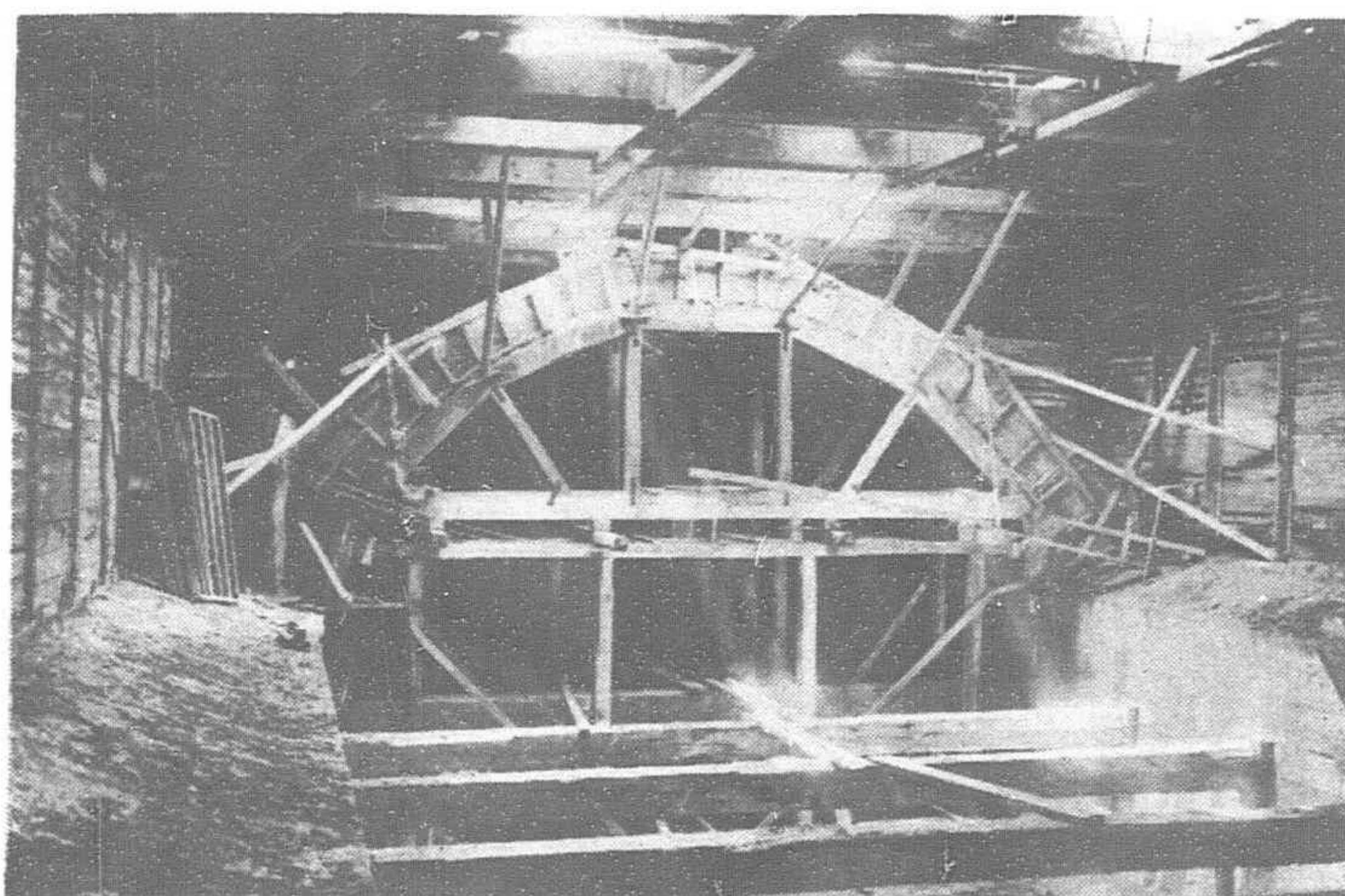
opened in April, 1938, the passenger average began to exceed 100,000 and the intake ¥8,000 daily.

Functioning with 28 coaches, the Osaka Subway is serving eight at three-minute intervals at the present time. Two-coach and three-coach trains, depending upon traffic volume during the day, are now being operated.

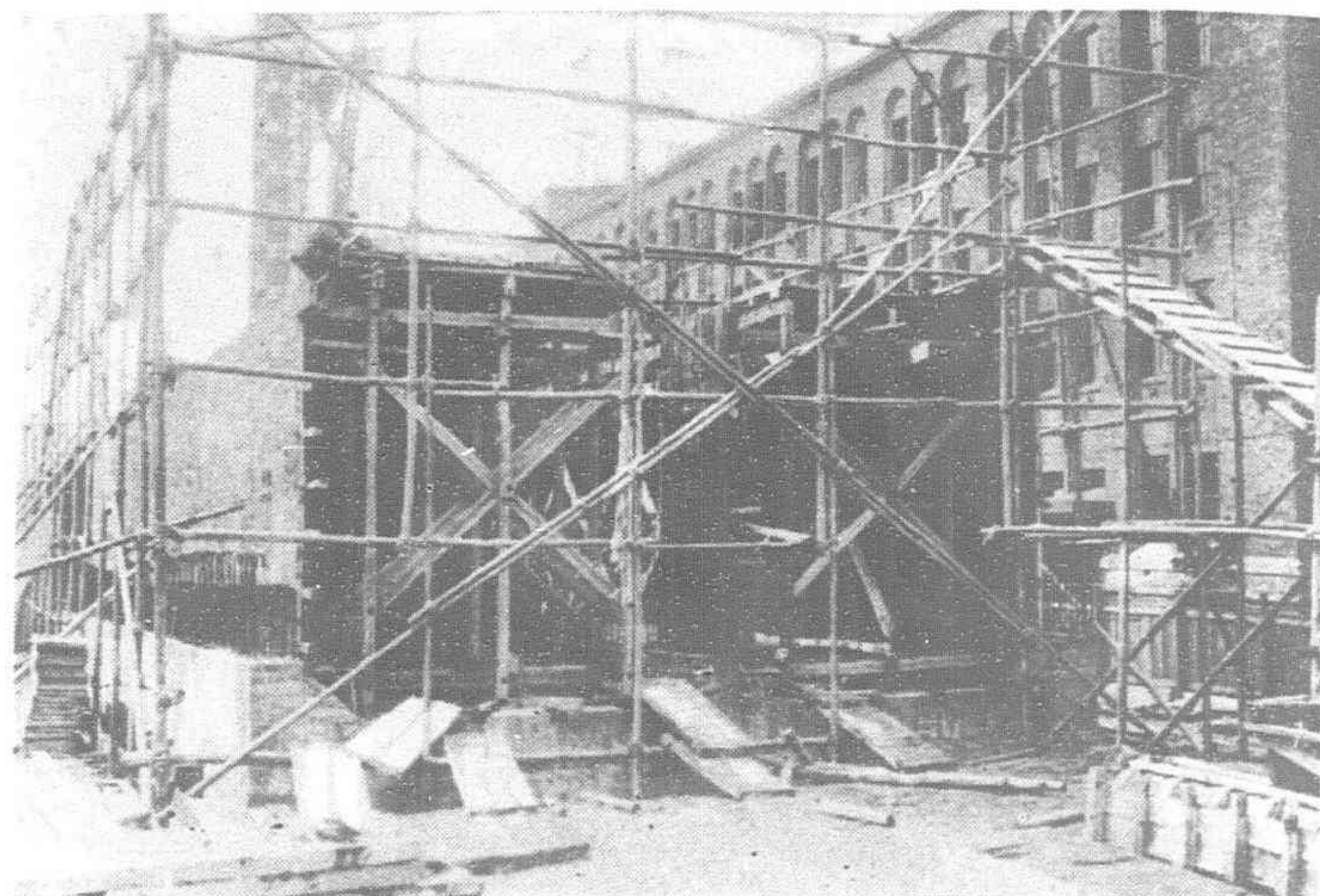
Sand and deposits of fluvial soil upon which the city of Osaka lies furnished difficult engineering problems to solve in excavating particularly under watercourses where the tunnel structure was being pushed. At one point the tunnel runs beneath four 44-meter (144-ft.) highway, widened under the city planning program, which spans the Dojima River and the Tosa and Naga canals by a bridge having two flat arches with open abutments which was constructed simultaneously with the subway.

At street intersections the open-cut method with sheet steel pile driving and the excavated area covered with decking is being used. In some places it was found necessary to drive 20-meter piles into the soft subsoil in order to reach a sufficiently firm foundation.

The tunnel structure itself is about 4.9 meters



Semi-circular arched tunnel in process of construction, May 3, 1939



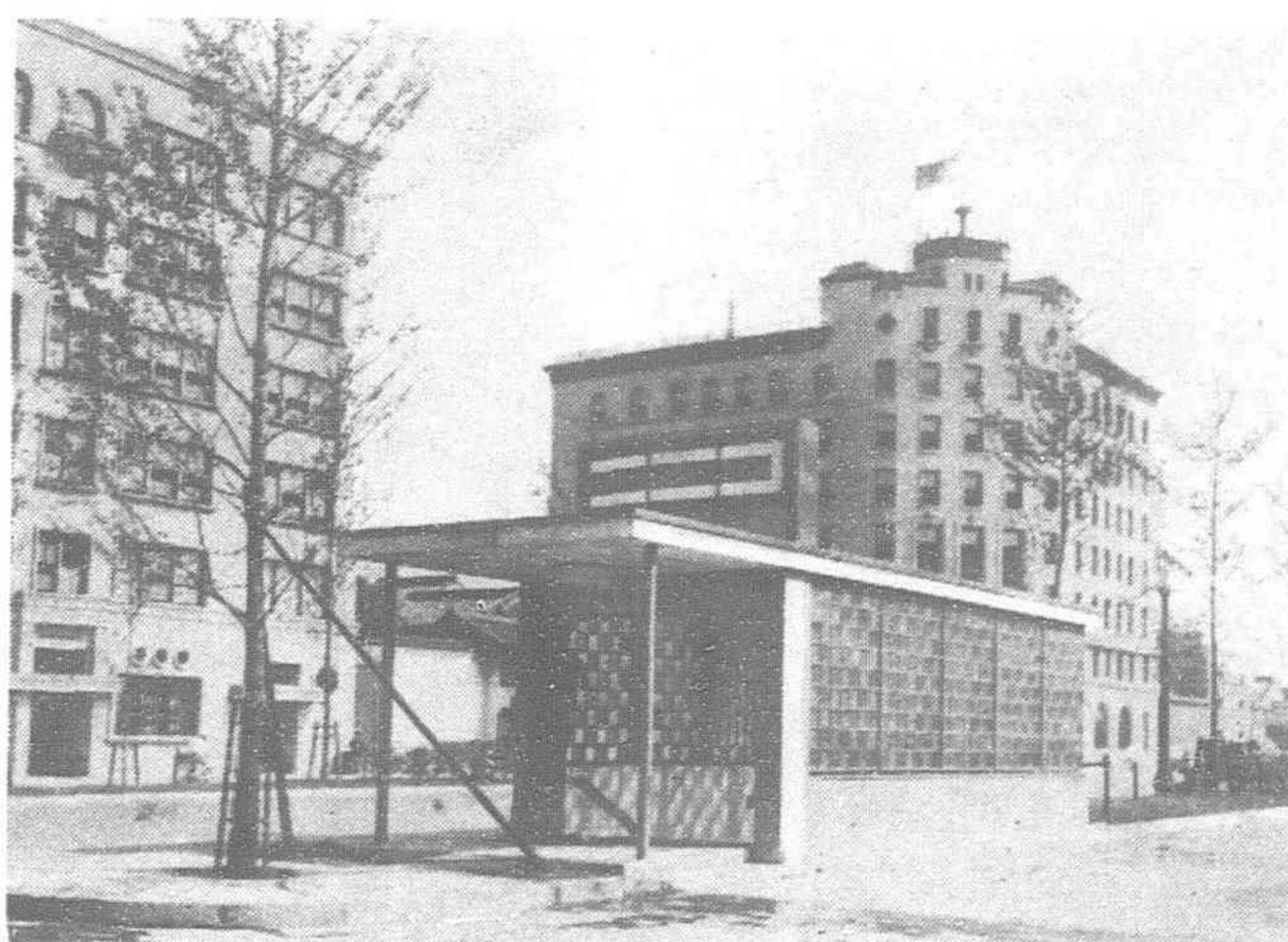
Section of subway where the caisson method of construction is being employed, May 6, 1939

high and four meters wide for each track-bed.

In excavating by the open-cut method at canals and rivers, cofferdams are erected by driving sheet steel piles to divert the water temporarily while excavation and construction progresses. Brick in mastic or asphalt fabric for waterproofing is applied to the outside of the subway structure.

To transmit electric power in the tunnel, the third-rail, upper-contact system is used, with the lines weighing 150 pounds a yard and carrying 750 volts D.C. The substation at Umeda takes 22,000 volts A.C. from two sources and transforms it through two sets of 2,000 kw. rotary converters.

Underground signals consist of



Typical entrance and exit to the Osaka subway at the Honmachi station

three-color lights used in conjunction with automatic train stoppers. The operation of interlocking switches at crossovers is effected by means of an electro-pneumatic mechanism.

Ceiling and wall surfaces within station limits, mezzanines and platforms are lit by indirect lighting. At specified intervals between stations electric lights are installed to illumine the underground right-of-way. In the event of temporary current shortage, storage batteries will be cut in to provide current to light stations and tunnel sections.

The subway construction cost in Osaka, including rolling stock and other equipment, has increased from Y3,700,000 to Y4,000,000 for each kilometer completed.

Steel Mills to Buy American Machinery

ON the heels of the completion of plans by the Shibaura Engineering Works of Tokyo and the United Engineering and Foundry Works of Pittsburgh, to jointly found a Y16,000,000 company for the manufacture of rolling mill machinery, two of Japan's leading steel companies have decided to construct two huge new rolling mills and to equip these plants with almost Y18,000,000 worth of American machinery, a *Japan Advertiser* reporter has learned.

The Japan Iron and Steel Manufacturing Company, Japan's largest steel concern, toward the end of this year will begin the construction of a Y10,000,000 strip steel mill expected to produce 500,000 tons of 80 inch wide sheets of strip steel a year for use in making automobiles.

A contract has been placed with the United Engineering and Foundry Works for \$4,000,000 worth of strip mill equipment and Mr. Shoichi Hirase, an engineer of the Japan Iron and Steel Manufacturing Company, left for Pittsburgh early this month in order to discuss with the American firm's officials the best types of machinery to be used under the conditions in Japan and to discuss the best methods of installation.

On his return to Japan in about six months Mr. Hirase will supervise the installation of the American equipment in the new plant, which is to be set up at Hirohata, near Kobe. The Y70,000,000 plant is scheduled to be completed by the end of next year. The order for the machinery was placed through the Mitsui Bussan Kaisha, representative in Japan of the United Engineering and Foundry Works.

About the beginning of August the Nippon Kinzoku Kabushiki Kaisha will begin the construction of a Y5,000,000 rolling mill, scheduled to turn out 10,000 tons of sheet steel annually after its completion about the end of this year.

The Nippon Kinzoku Kabushiki Kaisha has purchased roughly Y3,000,000 worth of rolling mill equipment from the United Engineering and Foundry Works and motors and electric equipment from the General Electric Company. On the completion of the new mill, which will be located at Kawasaki, the plant will be engaged in the rolling of steel ingots into flat sheets about eight by 10 feet in size, which are expected to be sold principally to chemical firms, and companies engaged in the making of submarines and of arms.

In order to supervise the installation of the American equipment in the Kawasaki plant and to train Japanese workmen in its use, two American engineers arrived in Japan aboard the *Kamakura Maru* on July 12 for a six month stay.

Mr. Theron Wade Jenkins, an electrical engineer of the United Engineering and Foundry Works, and an expert of sheet mill equipment, will supervise the installation of the rolling mill equipment sent by his company. He is accompanied by Mrs. Jenkins.

Mr. James Daum Campbell, an electrical engineer of the General Electric Company, will take charge of the installation of the electric motors and other electric equipment furnished by his company. The Nippon Kinzoku Kabushiki Kaisha, which is building the Kawasaki plant, it will be recalled, is jointly owned by the Mitsui, the Sumitomo and the Furukawa interests and is Japan's leading maker of stainless steel.

The Scrap Rubber Trade

INTERNATIONAL trade in scrap rubber comes under detailed discussion in the *Rubber News Letter* issued by the U.S. Bureau of Foreign and Domestic Commerce. Although some direct use of scrap tyres in manufacture of heavy mats, tyre boots and blow-out patches, and scrap inner tubes in making rubber bands, is practised in the United States, and the tyre re-treading industry retards the scrapping of partly worn casings, the principal use of scrap rubber in America, it is pointed out, has been in the production of reclaimed rubber. This is likewise true in the other principal rubber manufacturing countries, which account for a large part of annual scrap rubber imports into consuming markets. But it is not the case in Spain, where a very large industry was devoted to direct manufacture of footwear from worn tyres, and, taken as a whole, foreign markets have made far more direct use of scrap rubber in manufacture than has the United States. Foreign demand for this reason has been much less dependent on the price of crude rubber than in the United States. Supplementing domestic supplies of scrap rubber, imports into the United States are received mainly from Canada, with smaller amounts from Europe, and occasional minor imports from Australia, Japan, Argentina, and other countries. United States' imports were formerly much larger than in recent years. Canada also imports substantial quantities of scrap rubber from the United States for use in reclaiming. The United Kingdom imports less scrap rubber than Canada, as a rule, having a large surplus of domestic scrap for export.

Continental Europe

Turning to Continental Europe, in which the chief importing countries have been located, France was the most important importer in 1927-1931. In France the material was used for reclaiming and also (Southern France) in direct manufacture of cheap footwear used by peasants. The imports were stimulated greatly by high prices for rubber during the Stevenson Restriction Scheme period, but, with increased consumption of rubber in France and greater domestic supplies of scrap than formerly, French imports of scrap have been low in recent years. Spain ranked second among European nations in volume of scrap imports 1927 to 1931, and took first position from 1932 to 1935, after which the trade was interrupted by internal disorders and the Civil War. The end of that war may bring renewed demand from Spain, which formerly imported mainly from the United States, the United Kingdom, France and Germany. The Netherlands has imports of some consequence, but never very large.

German and Italian Requirements

Germany ranked third among European imports of scrap rubber in 1927-1929, after which imports declined until the introduction of International Rubber Regulation, when they were resumed at about the pre-depression level for 1934 and 1935. In 1936, with the introduction of strict German Government measures of rubber conservation, scrap rubber imports increased to a new high record of nearly 23 million lb., and in 1937 the huge total of 90 million lb. was imported (30 million lb. from United Kingdom and 29 million lb. from United States).

Coinciding with heavy 1937 imports of crude rubber, it appears possible that some part of this may be for inventory purposes, especially since the imports were not maintained at so high a rate in 1938, declining to about 36 million lb. Italy, which in 1927-1937 had been a fairly steady importer of five to ten million lb. annually, reported imports of more than 20 million lb. for 1937. Coupled with the fact that exports of scrap rubber from both Germany and Italy were negligible in 1937 and 1938, it is apparent that supplies of scrap rubber available in these countries were greatly increased. Incidentally, there is a large trade in scrap rubber through the free port of Hamburg, with an annual surplus of imports over exports, which is, presumably, imported into Germany proper, and hence appears in the German trade statistics.

INTERNATIONAL TRADE IN SCRAP RUBBER

Annual Imports, 1927-1938, in 1,000 lb.

Year	United States	U.K.	Canada	France	Netherlands	Spain
1927	20,448	5,865	8,229	11,520	2,351	12,380
1928	19,658	6,247	8,369	20,290	3,071	19,050
1929	20,160	6,734	6,695	34,710	3,938	22,100
1930	10,744	4,048	4,572	28,080	984	27,710
1931	9,514	4,078	2,556	20,390	944	15,840
1932	5,942	1,356	1,847	17,360	1,065	24,820
1933	6,866	915	2,350	12,330	644	17,410
1934	9,797	1,957	2,999	8,000	2,043	30,260
1935	8,843	1,711	2,799	7,620	1,475	34,200
1936	13,235	1,855	3,593	6,620	1,506	10,800
1937	13,589	4,291	4,054	9,140	3,093	1,000
1938	7,310	2,649	5,074	5,653	3,153	600

France estimated 1927 through 1933, basis of exports from United States, United Kingdom, and Germany to France, taken as 90 per cent of total.

Spain estimated 1935-1938, basis United States exports to Spain (75 per cent).

United Kingdom 1938 estimated from United Kingdom imports of "scrap and reclaim."

Year	Germany	Italy	China	Hongkong	Japan	Total
1927	17,750	7,100		100	2,891	88,634
1928	17,910	9,375		1,370	3,971	109,311
1929	11,355	9,441		3,260	6,235	124,628
1930	7,518	9,340		7,100	2,682	102,778
1931	5,200	7,307	11,200	4,294	2,550	83,873
1932	3,628	6,340	7,900	7,240	1,374	78,872
1933	3,965	6,052	8,740	7,360	1,798	68,430
1934	17,500	5,700	14,650	9,665	2,022	104,593
1935	17,312	4,891	18,225	10,670	1,870	109,616
1936	22,925	1,770	13,515	6,915	5,045	87,779
1937	90,000	9,442	21,950		11,025	167,584
1938	36,000	20,295	20,770		13,000	114,504

China estimated 1931-1933, China and Hongkong 1927-1930 and 1937-1938, basis of United States exports to these Markets.

Japan 1938 estimated from eleven months' statistics.

Germany 1937-1938, estimated from official statistics reported under several classes.

The remaining large markets for scrap rubber are in the Far East. China and Hongkong, like Spain, have been far more important as consumers of scrap rubber than as users of new crude rubber. These instances (with extreme ratios of scrap rubber to crude consumed annually) give rise to a reflection that the value of scrap rubber as a material for further use in manufacture has been to a considerable extent ignored, except in regions where economic pressure led to its more thorough application, and also that the real value of the commodity is high in case of national emergency. It has been necessary to estimate the volume of trade for France, Spain, China and Hongkong for certain years. The market in China and Hongkong has been affected by the war in China, but imports in 1937-1938 were, as a whole, well maintained. Probably cessation of hostilities there would eventually result in increased imports of scrap rubber.

Japan, the other Eastern importing nation shown in the table, averaged about three million lb. annually from 1927 through 1936, but in 1937 imported 11 million lb., and in 1938 the United States shipped 16,634,000 lb. to Japan. Some of the shipments made during the last two months of 1938 did not reach Japan until 1939, and Japanese 1938 imports are, therefore, less than these U.S. shipments to Japan. In March, 1938, Japanese importers of scrap rubber formed an association, and it is reported that purchasing is concentrated in the Mitsui Company. In view of Japanese restrictions on imports of crude rubber, it appears that the scrap rubber imports are used to eke out limited supplies of crude rubber. Thus far, Japan has placed orders for scrap rubber almost wholly in the United States.

It is a rather striking fact that in the past two years the Totalitarian States have been the heaviest purchasers of scrap rubber, which is exported mostly from the Democratic States. Economy in use of crude rubber is being practised in Germany, Japan and Italy far more than in other countries.

Additional countries importing scrap rubber from the United States are chiefly Belgium, Argentina, Uruguay, Algeria and Tunis,

(Continued on page 346)

Gold Mining in the Philippines

By RIZAL F. GATICA

THE gold mining industry of the Philippine Islands continued its remarkable progress during the first half of 1939, with the total production valued at P.35,280,013.26, or an increase of 13 per cent over the output valued at P.31,180,818.35 during the corresponding period in 1938. The production of eight new mines which opened this year made a substantial contribution to the increase in production and more than offset the suspension of operations in two small mines.

Like in other gold producing areas of the world, the rate of increase this year in Philippine gold output has slowed down. The increase in the first six months of last year was 26½ per cent over the same period in 1937. While it may be that the law of diminishing returns has apparently started to operate in gold mines in other countries, which might have reached the saturation point of their production as they have been exploited and worked out for so many years, the same situation cannot be said of Philippine mines as it was only ten years ago that the Islands witnessed the start of large scale development work in her gold deposits.

The decline in the rate of increase in Philippine gold output this year is not therefore due to exhaustion of ore reserves, but the drop resulted from interruptions in milling operations incident to expansion adjustments made in several mills. This was aggravated by the unexpected discovery of somewhat lower grade ore in two or three big mines which resulted in decreased value per ton of ore milled.

Despite this slight drop in the rate of increase, it has been estimated that the production for 1939 will reach an all-time high of P.73,000,000 which will undoubtedly place the Philippines among the first six gold producing countries of the world. In 1937, the Islands was ninth on the list, being surpassed only by Japan but in 1938, with a production valued at P.64,623,205, the Philippines topped Japan and Rhodesia. Three times during the past six months, the monthly output passed the six million peso mark, a new record, and it is expected that during the next half of the year, the monthly total will not fall below this figure.

Under the United States Flag, the Philippine Islands has already outstripped all states and territories, except California, in annual gold production, fulfilling predictions made some four years ago that the Islands would surpass Alaska in output. This has been accomplished since 1936. Of the reported 1938 gold production of the United States and its possessions valued at \$178,713,815, the Philippines contributed approximately 17 per cent.

The remarkable progress of the gold mining industry in the Islands is shown more in the fact that during the first half of 1939, 12 mines, including two operating and management corporations, paid P.9,603,226.62 in cash dividends. In other words, more than 23 per cent of the gold mined during the period was returned to the stockholders of the companies which produced it. In addition, one company paid a 100 per cent stock dividend which doubled

the holdings of its stockholders. In the whole year of 1938, cash dividends amounted to P.22,347,491, or more than 34 per cent of the gold produced that year. It is believed that a few more companies will be able to pay their first dividends this year, while those which are already in dividend-paying basis may increase their disbursements during the next two quarters of 1939.

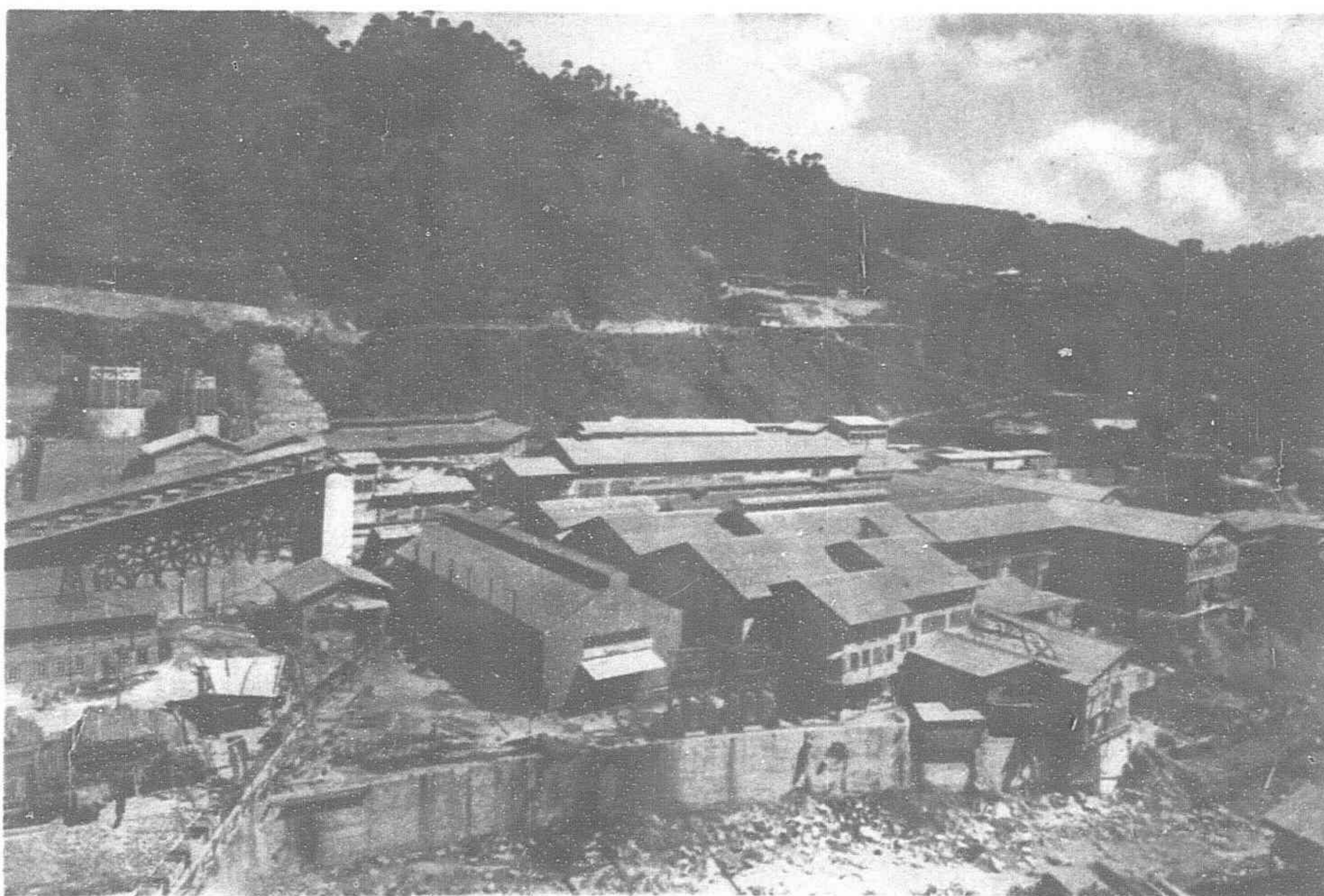
Among the gold mines in the Philippines, Balatoc Mining Company, headed by Judge John W. Haussermann, an American old-timer in the country, is the largest producer with an average monthly output of over a million pesos. The mill capacity of the mine is 2,000 tons of ore a day. The mine is located in the famous gold region, Baguio district, in Mountain Province, Luzon island. Sixty-four per cent of the stock of Balatoc is owned by Benguet Consolidated Mining Company, also headed by Mr. Haussermann. Under the management of Benguet Consolidated, Balatoc attained its present position, at one time was rated the best mine in the world in point of value per ton of ore. Benguet Consolidated took over the management of Balatoc in 1927, after its organizers almost gave it up as they failed to make it a paying mine. From 1929 to 1938, Balatoc produced more than P.77,000,000 worth of gold and

silver, and paid P.36,500,000 in cash dividends and 250 per cent in stock dividends. For the first two quarters of 1939, Balatoc paid P.2,700,000 in cash dividends on six million shares outstanding with a par value of one peso per share. Production amounted to over six million pesos.

Benguet Consolidated Mining Company, the second largest producer, may be justly called the parent of successful gold mining in the Philippines. Besides owning 64 per cent of the stock of Balatoc Mining Company, Benguet Consolidated owns the Cal Horr mine, also located in Mountain Province. This mine has a separate mill and produced P.734,000 worth of gold

during the first half of 1939. Benguet Consolidated also operates and manages the Ipo Gold Mines, Inc., in Bulacan province, Luzon island, on a profit sharing basis.

The history of Benguet Consolidated sounds more like fiction than fact. For almost 15 years money was thrown into the property before it was able to give profits to its investors. The original owner of the mine was reported to have lost all his fortune during the company's trying years and died a poor man without seeing that the mine in which he staked all he had proved many years later to be one of the most profitable mines in the world. From 1916 to 1938, Benguet Consolidated dug out of the earth approximately P.87,500,000 worth of gold and silver and paid out in cash dividends nearly P.53,000,000, including profits derived from subsidiary operations, and 300 per cent in stock dividends. For the first six months of the current year, dividends totalled P.3,600,000 and production P.5,700,000. Benguet Consolidated is also located in the well-known Baguio district, Mountain Province, and has a milling capacity of 1,250 tons of ore a day.



The mill of the Balatoc Mining Company, largest gold producer in the Philippines, has recently been expanded to treat 2,000 tons of ore a day. In 1938 this mine produced P.12,782,801 worth of gold and paid P.6,600,000 in cash dividends

San Mauricio Mining Company, Paracale, Camarines Norte, southern Luzon, is to-day the third largest gold producer in the Philippines. The mine is under the management of Marsman and Company, an organization controlled by J. H. Marsman, a Dutchman who chose to become a Filipino citizen some two years ago. With British financial backing, Marsman operates eight producing mines and a few other properties under development. He has extended his mining activities in China and the Dutch East Indies, and recently has acquired options to operate two mines in the United States.

Other important gold mines are the Antamok Goldfields Mining Company, in Mountain Province, which until 1937 was the third largest producer; IXL Mining Company and Masbate Consolidated Mining Company, both located on Masbate island. These three mines are under the control of Andres Soriano, a Manila Spaniard and head of the well-known San Miguel Brewery and other business enterprises. Through his International Engineering Corporation, Soriano controls and operates five other mines. North Camarines Gold Mining Company, Mambulao Consolidated Mines, Inc., and Paracale National Gold Mining Company, all in Paracale district, southern Luzon, are now in production. Paracale Gold Mining Company, also in the same region, is expected to mill ore this year. A mine in Mountain Province, the Batong Buhay Gold Mines, Inc., will construct a 150-ton mill this year. Like the Dutchman, Marsman, Andres Soriano is still looking for more worlds to conquer in other gold producing countries of the world. He has recently acquired interests in two or three mines in Africa through his Anta-M-IXL Selection Trust, Ltd.

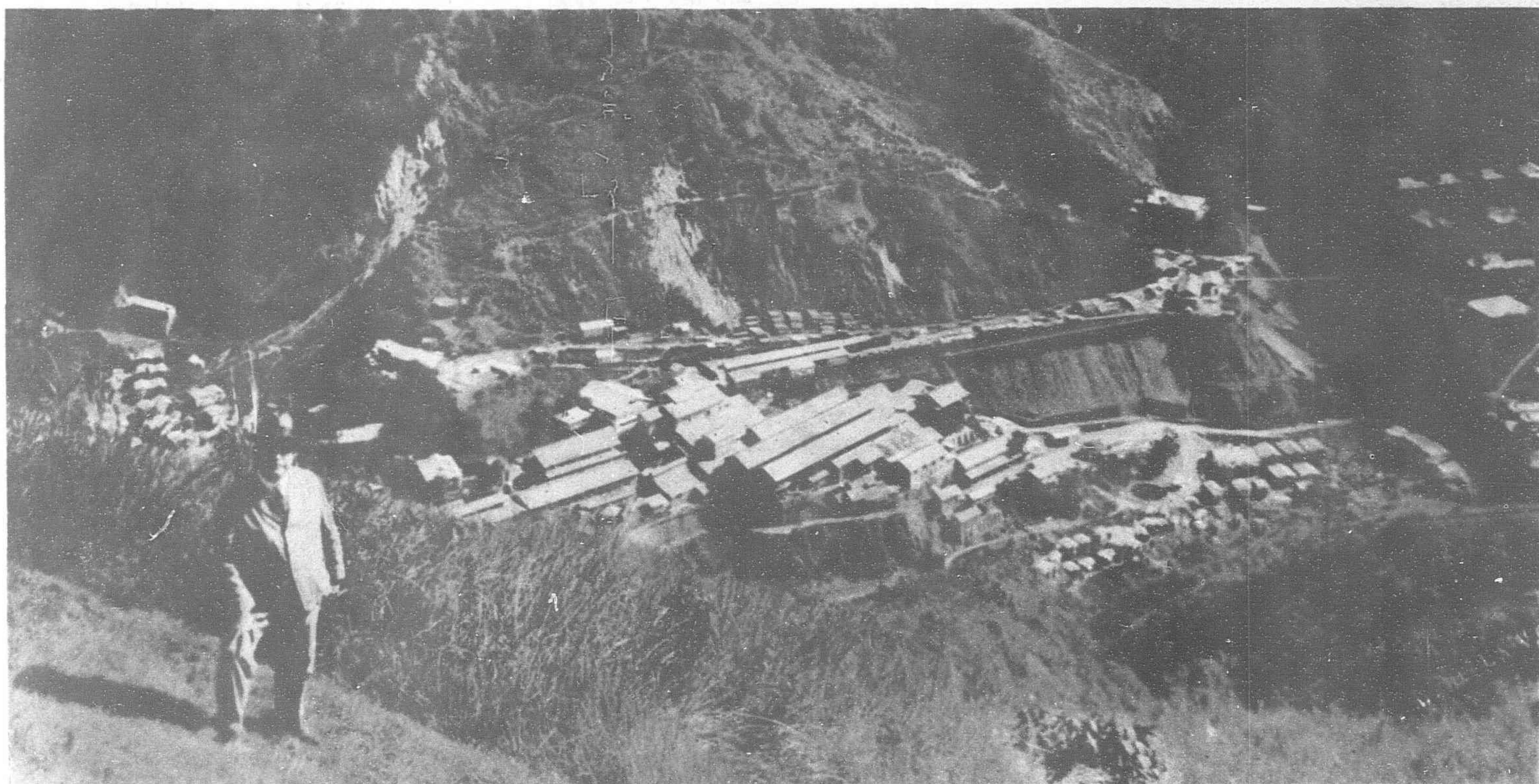
Other mines which contribute to the development of mining in the Islands are independently managed but controlled by American capital native in the country. These are the Baguio Gold Mining Company and Demonstration Gold Mines, Ltd., in Mountain Province; Mindanao Mother Lode Mines, Inc., Surigao Consolidated Mining Company, Tambis Gold Dredging Company, and East Mindanao Mining Company, in Surigao province, Mindanao island. A promising mine, Big Wedge Mining Company, in Mountain Province, is under the management of Atok Gold Mining Company, and another mine which has a bright future, Paracale-Gumaus Consolidated Mining Company in Paracale, is under the operation of Nielson and Company, headed by L. R. Nielson, a former typewriter salesman in Manila and now member of the Manila Stock Exchange and San Francisco Mining Stock Exchange.

Filipino capital has also contributed to the development of the industry in recent years. To-day there are at least seven

mines in production which are controlled by Filipino capital. Although these mines are small compared with most mines controlled by American and Spanish capital, they show bright outlook if efficiently managed and effective development work is followed. One of these, Macawiwili Gold Mining and Development Company, located in Mountain Province, has the proud distinction of being a purely Filipino enterprise not only in capital and management but also in technical engineering staff.

The present prosperous position of the gold mining industry in the Philippines is due to the pioneering work of American prospectors during the early years of American occupation. Mining is a recent industry in the Islands, and as an organized industry it was practically non-existent before the coming of the Americans in 1898. Until a few years ago, it was just an infant industry, its future possibilities never thought of and its development being made only as a sideline enterprise by those who went into it. To-day, after 38 years of checkered life, marked by innumerable failures and loss of properties and investments, it has become one of the major industries of the country, surpassed only by sugar in total value of annual production. It is now looked upon as one salvation to the new economic set-up that is certainly to take place after the United States withdraws from the Islands in 1946 as a result of the operations of the present Tydings-McDuffie Independence Act. The industry has already started to contribute substantially to the income of the Philippine government. It paid nearly four million pesos in direct taxes and other miscellaneous fees in 1937, and in 1938, the amount totalled P.5,778,850, or an increase of 54 per cent. It paid more than P.21,000,000 in salaries and wages in 1938, and purchased P.31,000,000 worth of machinery, equipment and supplies, including lumber. The capital paid up of all active mining companies has been estimated at P.100,000,000.

The rapid development of the industry during the past five years has been stimulated by the increase in price of gold from \$20.67 to \$35 per fine ounce by proclamation of President Roosevelt on January 31, 1934, making possible for several companies to mine profitably lower grade ore found on their properties, besides bringing about the organization of more corporations to develop known gold deposits in the country. Another contributing factor to the intense activity in the mining industry during the years 1933 and 1934 was the lifting of the Gold Embargo on August 28, 1933, by order of President Roosevelt, with the United States Treasury Department authorizing the sale through it of gold mined after that date at the world's market price. This resulted in the first mining boom in the



Benguet Consolidated Mining Company, second largest gold producer in the Philippine Islands, has a mill of 1,250 tons of ore a day capacity. This mine produced P.11,264,841 worth of gold in 1938, and paid cash dividends of P.8,400,000. The man in the foreground is Judge John W. Haussermann, President of Benguet Consolidated and of Balatoc Mining Company, father of Philippine mining and sometimes called the "Gold King of the Philippines"

Philippines, prices of mining shares in Manila rising to unprecedented highs and mining companies springing up like mushrooms with prospectors staking claims in every known gold district.

For several years after the Americans came the Islands, until 1933 and 1934, native capital had been timid about investing in mining ventures, not only due to the speculative nature of the industry and failure of many mining companies organized by American and other foreign business interests during the early days, but also due to the then unproven value and volume of gold deposits in the Islands. After a few mining companies succeeded in operating properties profitably with the introduction of new mining methods and modern milling plants, coupled with the increase in price of gold, native capital began to take an interest in mining.

The dark outlook for important Philippine products such as sugar, hemp, coconut oil and lumber and timber, in the United States market on account of quota restrictions due to the constant agitation of American agricultural interests, intensified during the depression years, and the closing of this market after independence is given in 1946 have forced many Filipino capitalists to shift their investments to other enterprises such as mining, which indeed has a brighter future. To-day, with few exceptions, the mining industry is dominated by capital native to the Islands, unlike the mines in the Rand in Africa.

As a result of the increase in mining activity and the influx of some foreign capital in 1936, Manila again witnessed a stock market boom and the consequent organization of two additional stock exchanges, a feat perhaps unparalleled in the history of any financial center of the world. However, one of the new exchanges actually opened in February, 1937, and closed after four months of operation. The International Stock Exchange, organized during the boom period in October, 1936, is now facing dissolution due to the present prolonged inactivity of the stock market.

While it is true that the bulk of the present increasing gold production has come from properties previously discovered in the era of Spanish rule, which were inadequately developed, a few areas have recently been discovered which may contribute substantially to the gold output of the Islands in the near future. A large portion of the country has still been left virtually unprospected, and hope is entertained that in regions where new mines have been recently opened, further prospecting may yet unfold rich vast gold deposits to reward the daring pioneering investor.

The following table shows the monthly gold production of the Philippines during the first half of 1939 as compared with the same period in 1938:

	1939	1938
January.. ..	P.5,469,756.47	P.4,766,368.58
February	5,302,384.90	4,608,361.10
March	6,053,426.67	5,297,598.34
April	5,870,701.73	5,404,431.13
May	6,381,693.23	5,498,992.28
June	6,202,050.26	5,605,066.72
Total	P.35,280,013.26	P.31,180,818.35

The table given below shows the value of annual gold production from 1909 to 1938 and portrays the progress attained by the industry in the past 30 years:

1909	P.495,194	1924	P.3,352,039
1910	308,860	1925	3,891,979
1911	379,096	1926	3,850,376
1912	1,140,424	1927	3,372,461
1913	1,736,724	1928	3,808,124
1914	2,349,267	1929	6,740,781
1915	2,633,548	1930	7,409,598
1916	3,011,755	1931	7,524,867
1917	2,645,784	1932	10,200,167
1918	2,575,970	1933	16,190,795
1919	2,619,449	1934	23,823,365
1920	2,424,606	1935	31,979,030
1921	2,626,192	1936	44,402,653
1922	2,932,092	1937	51,260,646
1923	3,372,654	1938	64,623,205

Note:—Production from January 31, 1934, to date is based on present price of gold at \$35 per fine ounce; for previous years, based on old price of \$20.67 per fine ounce.

The U.S. Improves its Position in the Philippine Market

(Continued from page 336)

Shipments to the American market of cigars, with but a slight loss in volume, showed a small increase in value, which amounted to 5,390,000 pesos.

Metal Output Increases

In contrast to agricultural products, the value of Philippine trade in metals increased materially in 1938. Production of gold established a record, with shipments to the United States valued at 61,014,000 pesos.

Because of heavy purchases by Japan of iron and manganese ores, the American market was practically out of the picture, but exports of copper concentrates to the United States increased substantially. Chrome ore shipments, though lower in volume, increased slightly in value.

For the first time since 1921, the merchandise balance of trade between the Philippine Islands and the United States showed an excess of imports in 1938. If, however, gold, which is shipped as bullion and ore, is included with commodity trade, the balance is reversed to an excess of exports amounting to 29,190,000 pesos. Exports of Philippine gold to the American market have increased steadily since 1933.

The Scrap Rubber Trade

(Continued from page 343)

the Philippine Islands, etc., which collectively took from the United States an annual average of 6,600,000 lb. of this material in 1935-1938.

The annual totals shown in the accompanying table are estimated to cover about 90 per cent of total international trade.

Saving Crude Rubber by use of Reclaim

In 1933 the United States consumption of crude rubber amounted to 409,000 tons and reclaim 85,000 tons, a total of 494,000 tons. For 1938 crude consumption is at present estimated at 411,200 tons and reclaim 114,300 tons, total 525,000, analysis on the basis of 1933 percentage use of reclaim indicating a saving of 22,300 tons of crude rubber through increased use of reclaim in 1938 against 1933. That this saving is not more impressive merely means that the price of crude rubber during the past five years never remained high for a long enough time to cause the wholesale change of compounds necessary to rapidly accelerate use of reclaim. That it has been high enough to cause gradual and permanent increase is apparent. Incidentally, a five per cent saving in crude rubber consumption has meant, in this case, nearly a 25 per cent increase in domestic consumption of reclaim, which has been reflected in employment and trade of scrap rubber collectors and dealers, and rubber reclaimers.—*The India Rubber Journal*.

Mineral Survey in China

Fourteen groups of experts will be sent to the pacified regions of China from Japan this year to conduct surveys on mineral resources there, reports the *Asahi*, at the request of the North China Provisional Government, the Central China Renovation Government and the Federation of Autonomous Governments of the Inner Mongolian Provinces.

It is expected that the surveys will cost Y350,000 this year, and Y500,000 next year and the year following. The three-year plan for the surveys will only cover the more urgently needed deposits.

The China Affairs Board is taking charge of the surveys. The men to be sent for the investigations will be selected shortly from various universities, the Commerce and Industry Ministry, the South Manchuria Railway's research department and the China Affairs Board's staff.

Each of the parties will have one mineral expert at its head, several junior experts, interpreters and assistants. Each party is expected to work for about a year.

Aerial Ropeways

By A. H. WRIGHT, A.M.I.Mech.E.

(Proceedings of The Engineering Association of Malaya)

PART I

As a subject for a paper of this nature "Aerial Ropeways" presents some difficulty owing to the fact that the purely technical or, if I may say so, the Drawing Office side involving those somewhat dull if important manipulations of empirical and mathematical formulæ would absorb the greater proportion of the time and space available. Therefore it is proposed to deal generally and descriptively with the subject and to attempt, with the aid of illustrations of typical plant, to show the wide range of application and the particularly flexible nature of the Aerial Ropeway as a means of transport.

Ropeway Systems

There are two systems upon which the design of practically all Aerial Ropeways is based namely, the Monocable and Bicable systems, the former being the first in chronological order having been developed in England by Hodson and subsequently brought to a practical and commercial state by Roe of Ropeways Ltd. who, incidentally during the author's association with them, were responsible for the longest and highest capacity Monocable Ropeway in Great Britain.

The Bicable system or, as Italian and some other manufacturers prefer to call it, the Tricable, was mainly developed by Adolf Bleichert & Co., A.G. the founder, Adolf Bleichert, having constructed a Bicable Ropeway to carry stone as long ago as 1871 to be followed in 1872 by Dr. Polig of Cologne with a similar plant.

The Monocable System

With this system, a diagrammatic arrangement of which is shown in Fig. 1, one rope only is employed which is made to serve the dual purpose of sustaining the dead weights of the individual loads being carried and of conveying these loads from one end of the line to the other.

This rope, which is looped and spliced endless, is supported by line sheaves carried from trestles, built either of timber, steel, or ferro-concrete, erected at intervals along the whole length of the line. Generally, the distance between each successive trestle varies between 300 and 1,000 feet but, in cases where the profile of the land being traversed provides sufficient depth for the sag of the rope on the loaded side...., this sag being generally calculated as three per cent to 3.5 per cent of the distance between the trestles....., the distance between trestles may be as great as 3,000 feet.

The line sheaves carried from these trestles may, for light loading be single, one on either side, though good modern practice even for relatively lightly loaded plant is to arrange at least two sheaves on the loaded side, while with the

heavier plant groups of four or more are employed on the loaded side with pairs on the empty side.

In order to ensure even distribution of the dead weight of the rope and loads between these sheaves, they are mounted on balance arms known technically as pair or quad beams for two and four sheave mounting.

Fig. 2 illustrates these sheave mountings as applied to a double Ropeway operating over country practically devoid of other means of transport.

To provide for the running of the rope the sheaves are given, in the center of their treads, a circular groove of the same or very slightly larger diameter than that of the rope, while a larger and wider groove is also provided so that the saddles or clips which attach the loads to the moving rope may pass over the sheaves without shock.

The type of bearing employed varies according to the conditions under which the plant is designed and may have to work but, it is generally considered better practice to use double ball or roller bearings especially if electric drive is employed for, by so doing, the static friction of the line is reduced very considerably hence obviating the necessity of large prime movers whose size is determined by the starting effort required rather than the full load torque. Moreover, with properly designed ball race housings the intervals between lubricant supply may be as long as 3/6 months.

At the ends of the line are the terminal stations for the loading and discharge of the goods or material being conveyed....., as with the trestles these stations may be timber, steel or ferro-concrete structures their elevation above or below ground level being dependent entirely upon the work for which the plant is designed, the normal limit of height or depth being an economic rather than a technical question.

Both loading and discharge terminals are provided with large diameter sheaves round which the end loops of the rope pass. These sheaves are normally carried on vertical or slightly inclined shafts, that in the loading terminal being generally designed to take the drive while that in the discharge terminal is mounted on a carriage designed to move horizontally in line with the axis of the ropeway on suitable rails.

This carriage is held in position by a live weight tension gear which serves to maintain a uniform and constant tension in the travelling rope thus keeping it up to its work and enabling it to sustain the loads being conveyed irrespective of the natural stretch and wear of the rope. The tension gear also provides against excessive and uneven loading for, should this occur, the live tension weight rises, automatically increasing the sag, and thereby maintaining the tensile load in the rope constant.

This tension gear must always be floating so that in order to provide for the considerable stretch which

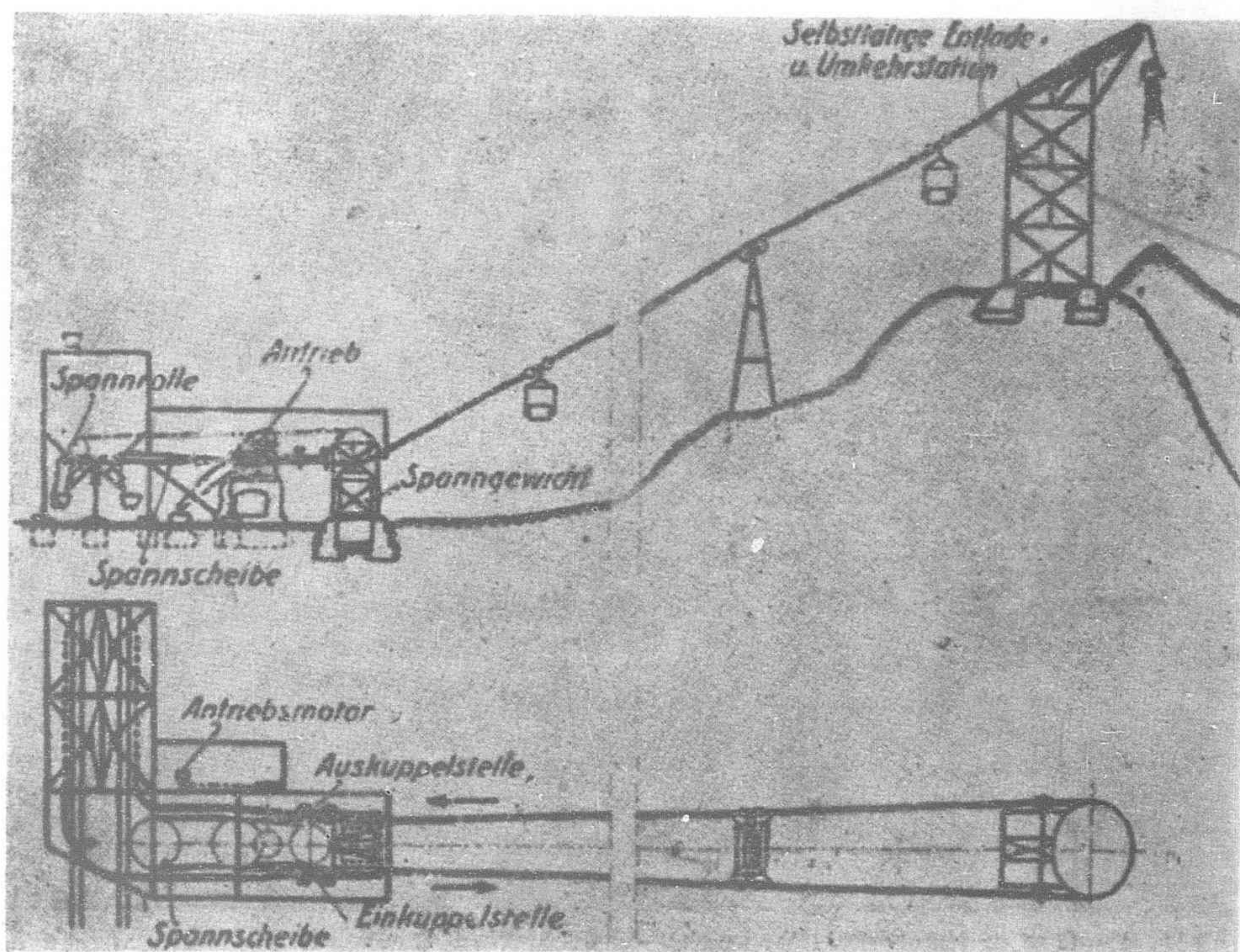


Fig. 1.—Diagrammatic arrangement of a monocable dumping ropeway

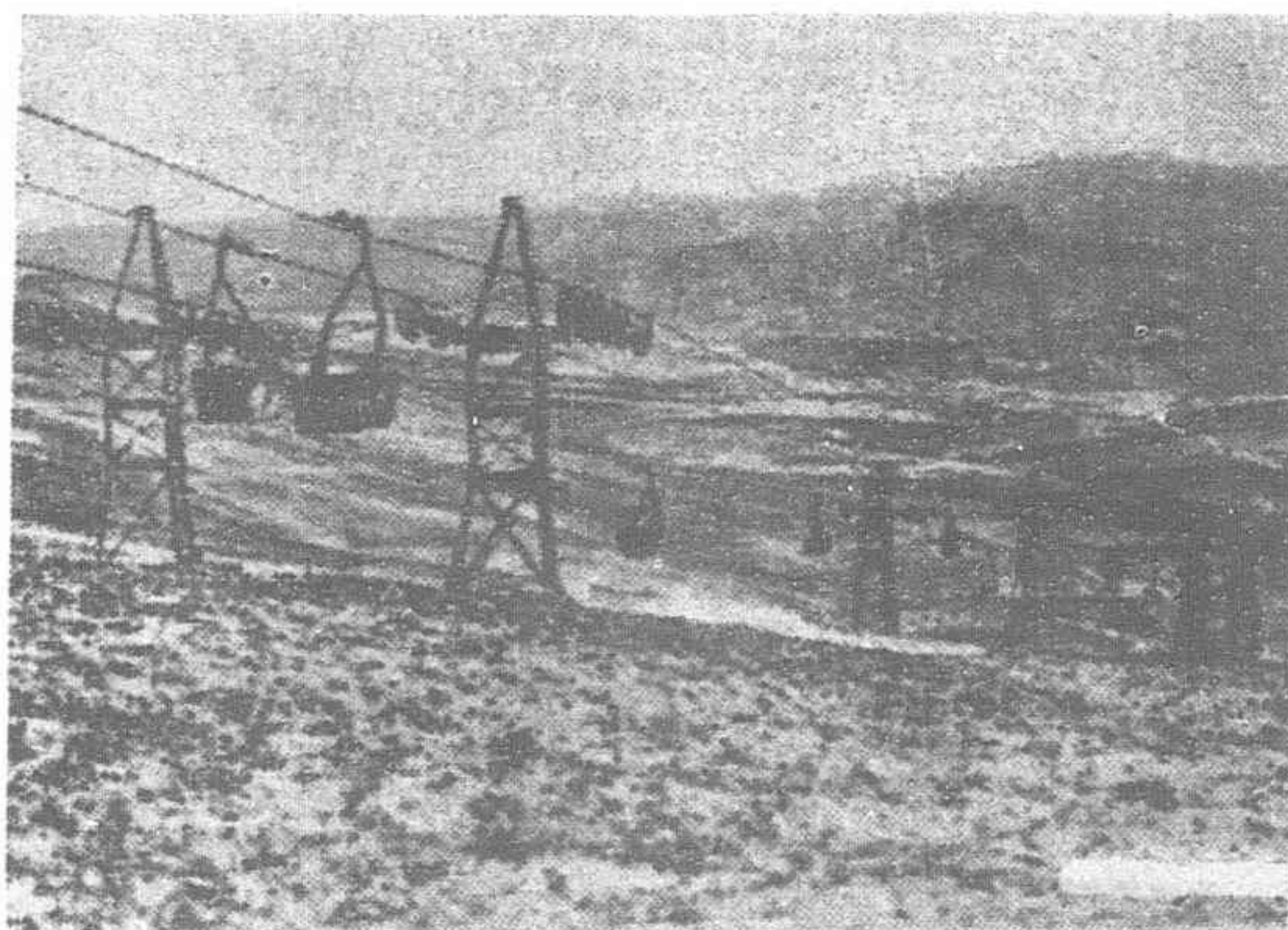


Fig. 2.—A double monocable ropeway in South America (Ropeways Ltd.)

four times the floating tension weight.

In deciding the value of the necessary floating tension weight account must be taken of the resultant effect of the weight of the travelling rope in consequence of which the arrangement of the tension gear at the terminal remote from the driving terminal is only the general case for plant between the terminals of which the difference in level is negligible or is such that the discharge terminal is lower than the driving terminal.

Where the discharge of return terminal is higher than the driving terminal, as in fig. 1, the tension gear is incorporated in the latter terminal, a second turnback tension sheave on a carriage being provided so as to enable the position of the driving sheave to remain constant.

Carried from both terminal structures are shunt rails on which the ropeway cars or carriers run from the rope uncoupling to the rope coupling points in a manner to be described.

There are many ways of giving the necessary drive to the rope, one of the simplest being to provide the large diameter sheave in the loading station, with a Vee groove, the necessary adhesion between the rope and the sheave being obtained by the wedging action of the rope in the Vee. This however is not good practice since it sets up heavy wear on the rope.

A special type of rope driving sheave known as the "Clifton" wheel has occasionally been employed in which the groove is divided into a large number of sections each consisting of a pair of movable jaws so arranged that, as the rope comes over and presses against the groove in the sections, the jaw sides are pressed in onto the rope, the intensity of the pressure and hence the grip exerted being directly proportional to the pressure the rope exerts on the jaw grooves.

Another method is to provide the main driving sheave with two or more separate circular grooves round each of which the rope is lapped for 180° and, by means of an idler sheave with one groove less in number, to take the rope out of one driving groove into the other. This gear, however, gives rise to objectionable inter-sheave rope stresses.

A still further way of imparting the drive to the rope where it is not desired to provide a large diameter driving sheave is to use a sheave of the fleeting or surge type which is provided with a wide flat bottomed groove round which the rope

takes place in hemp core spiral ropes some form of take-up apparatus must be incorporated which generally takes the form of a winch with which may also be incorporated a rope reeved multiplying sheave whereby the resultant pull on the Ropeway tension carriage is as much as

is lapped at least $1\frac{1}{2}$ turns or as many more as are thought necessary to give the required adhesion.

There are never less than $1\frac{1}{2}$ turns of rope in the groove the flat of which, for unidirectional working, is of taper section, the rope being wound in on the top or larger

diameter to uncoil from the smaller diameter, it being essential to keep the rope and tread well lubricated to allow of relatively smooth sliding or surging of the coils from the larger to the smaller diameter without shock.

If a reversible drive is required, as is the case with certain specialized applications, the tread of the groove is given a C section providing two large and one small diameter thus allowing surging to take place for either direction of rotation.

The "Clifton" wheel and surge wheel drives in common with the Vee groove sheave are, however, exceedingly detrimental to the life of the rope especially on medium or heavy plant and, in the author's opinion, by far the best means of imparting the drive to the rope is to use a large diameter sheave having a circular groove very slightly larger than the diameter of the rope, lined with leather or special hard wood wedges set on edge, round which the rope laps 180° only.

This method certainly involves sheaves of fairly large diameter but since it obviates rapid destruction of the rope and has proved in practice to have, itself, a very long life, it has been adopted by the leading manufacturers both in England and the Continent with marked success. A typical example of such a sheave is shown in Fig. 4.

In nearly all cases the driving sheave is driven by ordinary mill gearing, the drive from the prime mover being by belt or cotton rope in order to provide some flexibility in the transmission. It is general practice to provide a manually operated friction clutch though, in the case of direct steam or electric drive, this is not absolutely essential but for internal combustion engine drive its necessity is obvious.

This virtually completes the description of the Monocable line equipment with the exception of angle stations Where it is possible ropeways are better set out as perfectly straight lines between the two end terminals but circumstances frequently arise which preclude this, hence the angle station which merely serves the purpose of deflecting the line of the ropeway in the desired direction.

These stations are of similar construction to the terminal stations. Two large rope deflection sheaves are employed, one each for the loaded or outgoing and empty or return sides. It is here that the Monocable, as distinct from the

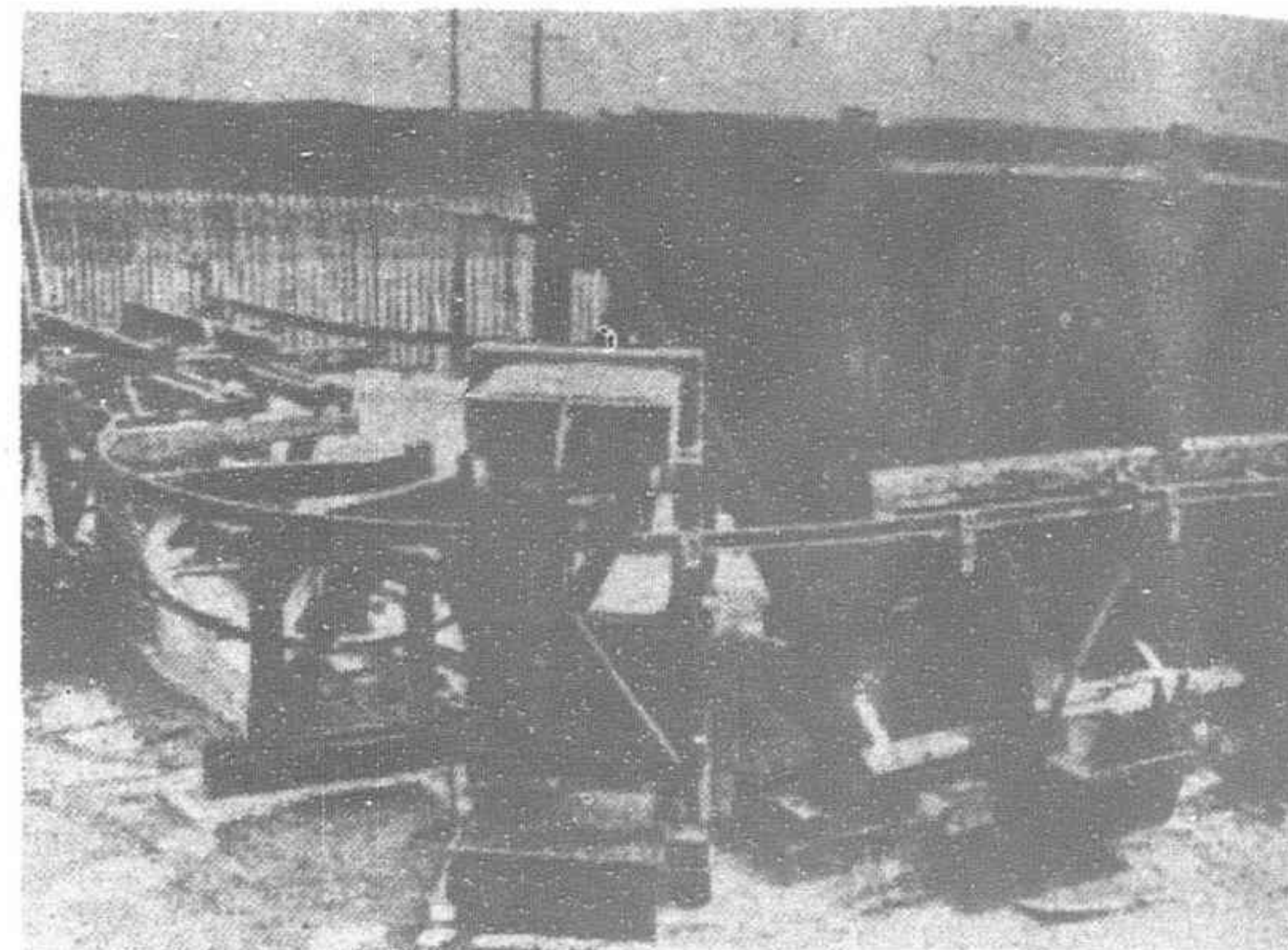


Fig. 3.—A simple monocable loading terminal with automatic car weigher (Ropeways Ltd.)

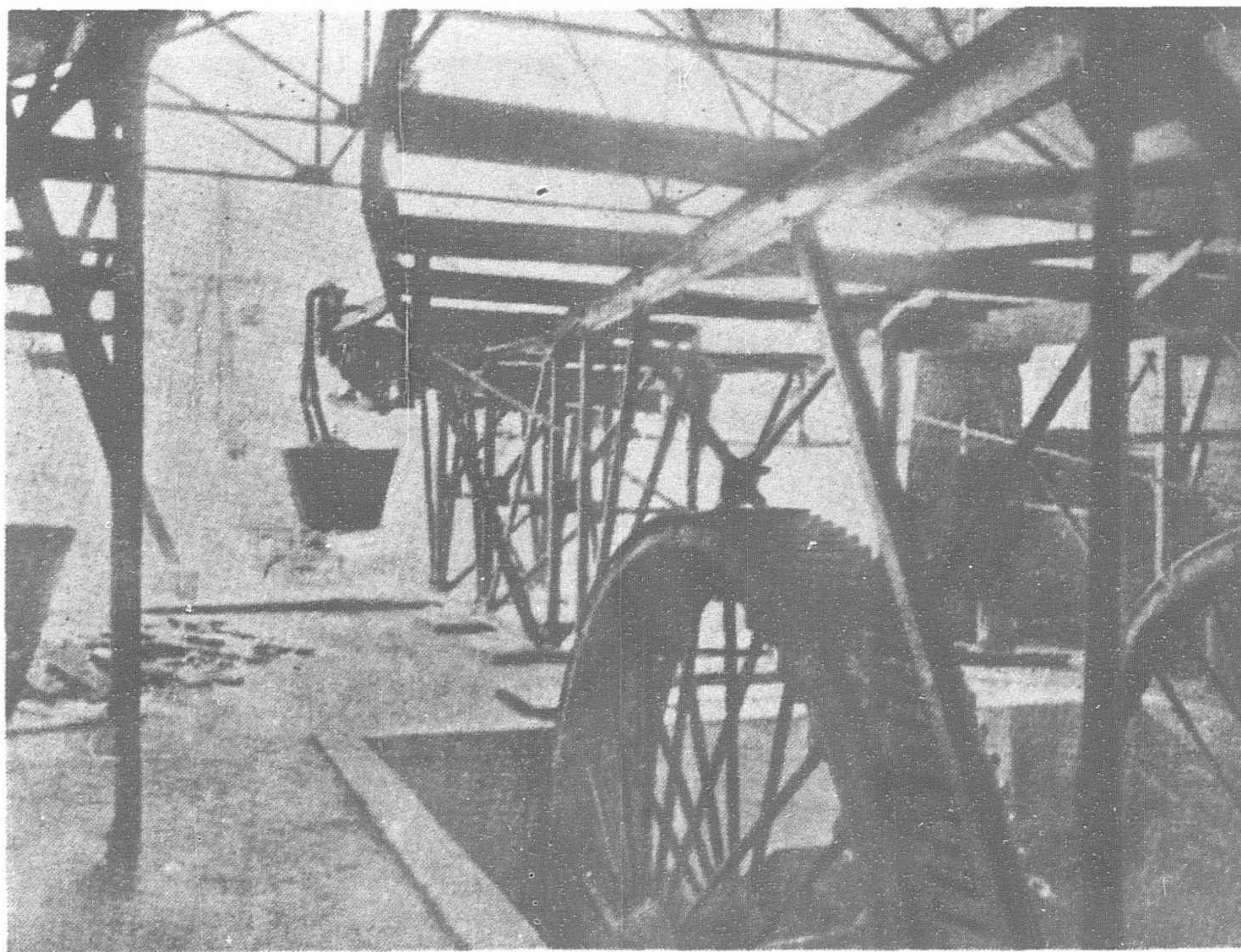


Fig. 4.—One of the 14-ft. dia. leather-lined driving sheaves of the Tilmanstone (Kent) 120 ton/hour monocable. Length of line $7\frac{1}{4}$ miles (Ropeways Ltd.)

Bicable, presents difficulties for, short of doubtful mechanical complications, it is only possible to negotiate convex angles automatically without manual assistance and this, only with certain types of car coupler.

Monocable Cars or Load Carriers

According to the nature of the goods or material to be transported the load receptacles may take the form of buckets, skips, platforms, boxes or drums which, in practically all cases, are attached by means of trunions to a steel hanger suspended from a carrier or boxhead.

This boxhead is fitted with two ball bearing mounted running wheels which enable it, with the hanger and load, to run on the overhead shunt rails in the terminals and, if there are any on the line, the angle stations, when free of the rope.

In addition there are one or two rope saddles, clips, or couplers attached loosely to the boxhead which engage the moving rope and so transport the whole assembly with the load along the line.

Of these saddles or clips there are two types generally distinguished by the terms "Passive" and "Positive." The "Passive" saddle, fig. 7, consists of a chilled casting having a groove slightly smaller than the rope on which it is to rest, and provided on one side of the groove with a small snug which engages between the strands of the rope and helps to prevent slip.

Where gradients are not very severe and the line is of a fairly ordinary nature, this type of saddle has proved to be quite efficient and simple but does not allow of automatic angle or return stations since it must disengage from the rope to allow the latter to pass round the deflection and turn-back sheaves. The method employed with these saddles in such stations is to automatically transfer the cars from the rope on to shunt rails.

The shunt rails are set on a suitable gradient so that the cars, on entering the station and being automatically disengaged from the travelling rope, engage with these rails along which they travel by gravity to the station exits where the rope saddles automatically re-engage the travelling rope.

This arrangement can usually be relied upon to work practically automatically, but it is necessary to have at all times attendants on duty in case a car fails to disengage or engage the rope properly or stops on its journey along the shunt rails. This comment applies equally to the discharge terminal where the ropeway car has to leave the rope and travel on a graded and looped shunt rail to re-engage the rope on the empty side of the line.

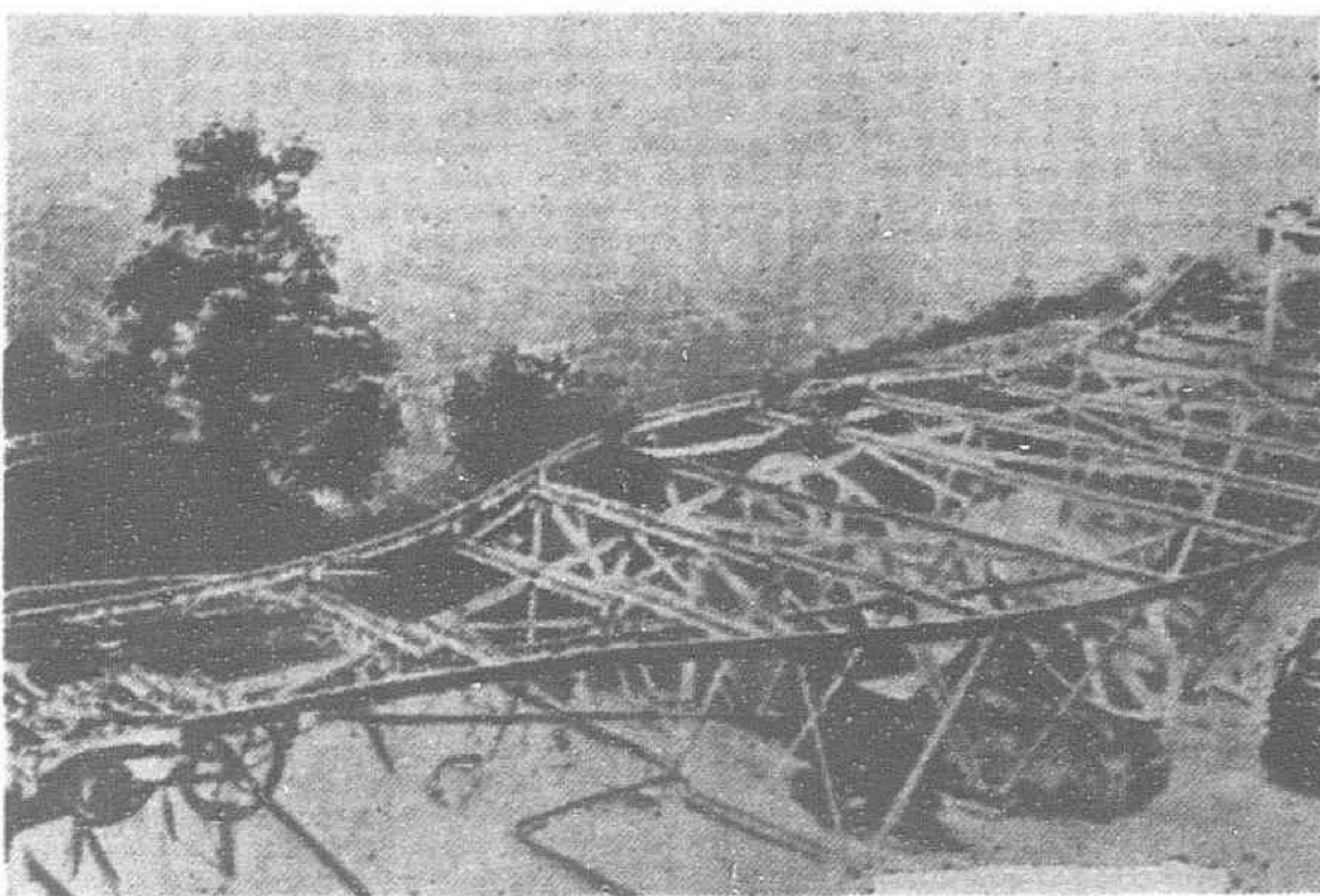


Fig. 5.—A monocable angle station at ground level showing inclined rope deflection sheaves (Ropeways Ltd.)

Designs have been produced and apparatus made to run the cars with the "Passive" type of rope saddle automatically round discharge or return terminals and through angle stations, but such gear introduces complications which are particularly undesirable in a transport system and even with expert attendance have so far not functioned at all well.

Where gradients are particularly severe the "Positive" type saddle, or more properly speaking, coupler, is employed. This type of coupler is made in various forms all dependent on the same principle namely, a fixed and movable jaw so arranged as to fit over the rope, the action of the moving jaw being controlled through levers by

gravity due to the dead weight of the hanger, load receptacle and load, thereby positively gripping the rope, automatically allowing for rope wear and thus eliminating periodic adjustment and renewal as is the case with the "Passive" type saddle.

From the foregoing it will be clear that the "Positive" type of rope coupler enables reasonably severe gradients to be negotiated and, due to improvements, made notably on the Continent and by Messrs. White of Widness, return terminals can be negotiated without disengaging the coupler with its load carrier from the rope. It will be obvious however, that only convex angles can be automatically negotiated, a really successful design of Monocable coupler for concave angles having not yet been successfully applied, hence, Monocable angle stations can only be semi-automatic, i.e., automatic in operation on one side only even when using the "positive" coupler.

An important consideration in any transport system is the ease and expedition with which the loading and discharge of the goods or material being carried may be effected.

The simplicity with which loading can be carried out at the terminal of a Monocable Ropeway will be appreciated from fig. 3, where bulk material is fed into each car skip via a chute and gate, the car being momentarily held stationary on the shunt rail by one of the station operators.

Fig. 9 shows a Monocable loading station designed to operate in connection with a wagon tippler as the means of feeding the buffer hopper.

With materials other than waste products such as colliery refuse, etc., which have to be dumped or otherwise disposed of, the Ropeway cars are generally arranged to pass over bunkers or hoppers into which their loads are discharged by automatically tipping the skips. A typical arrangement of this nature is shown in fig. 10.

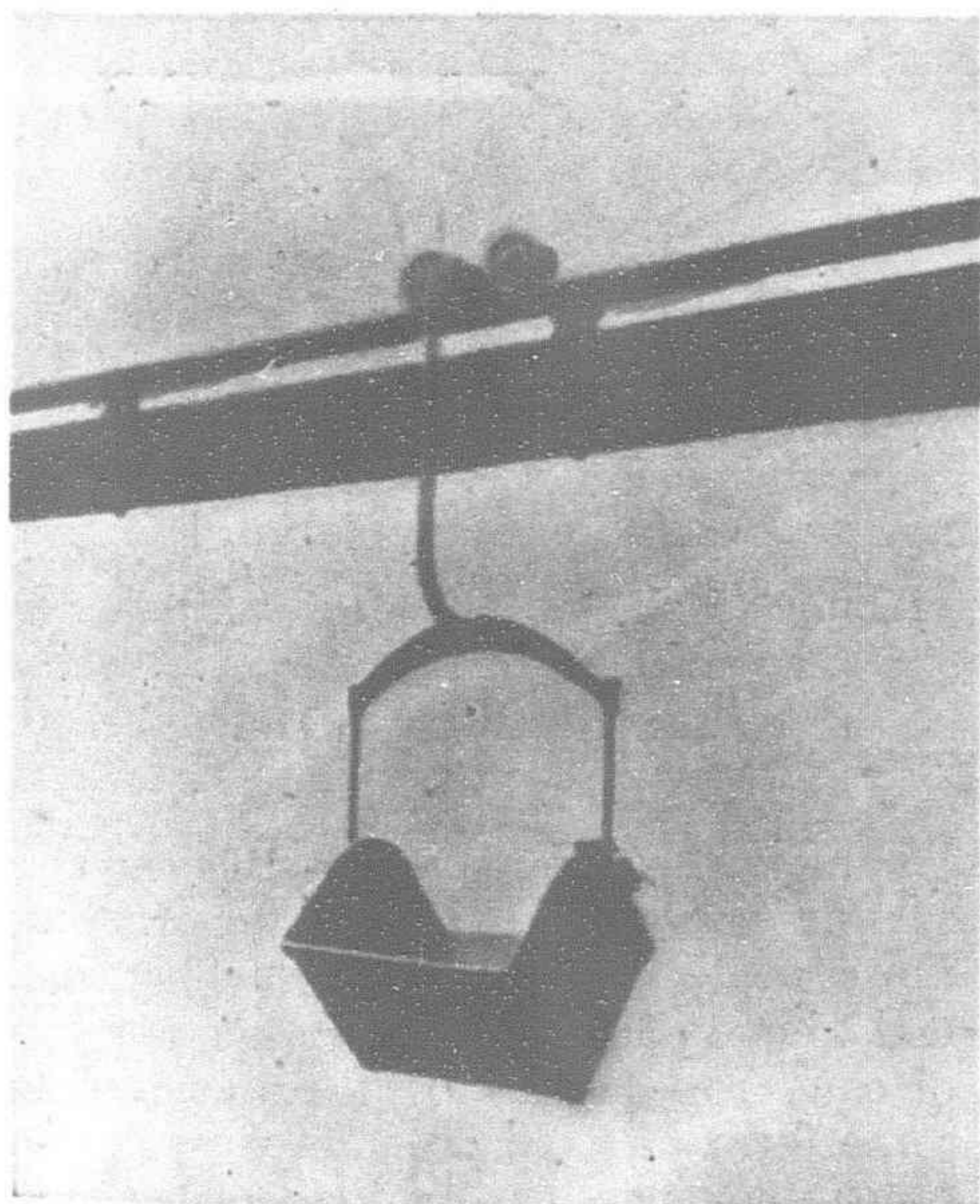


Fig. 6.—A simple light duty monocable ropeway car (Ropeways Ltd.)

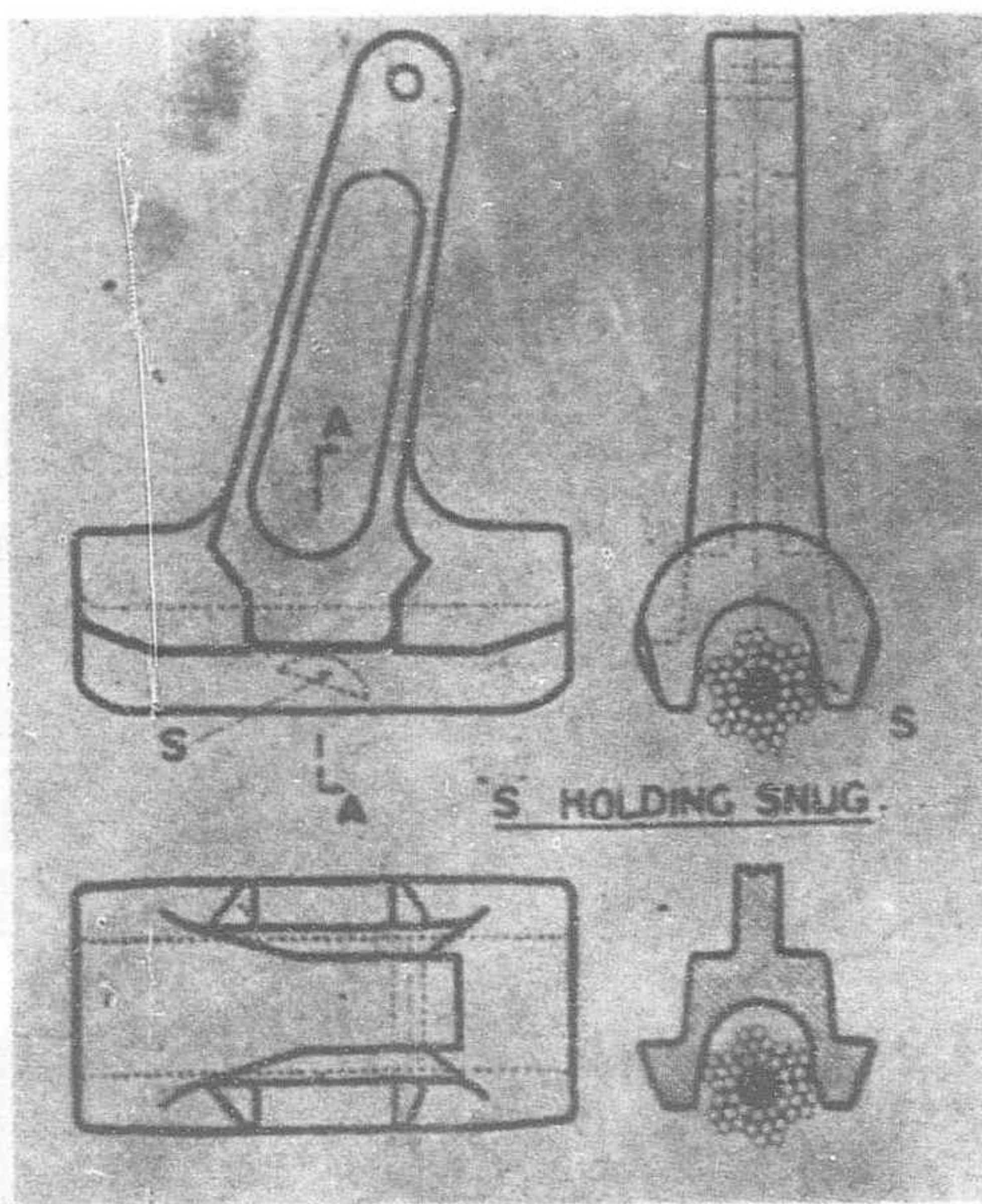


Fig. 7.—The "passive" monocable ropeway saddle

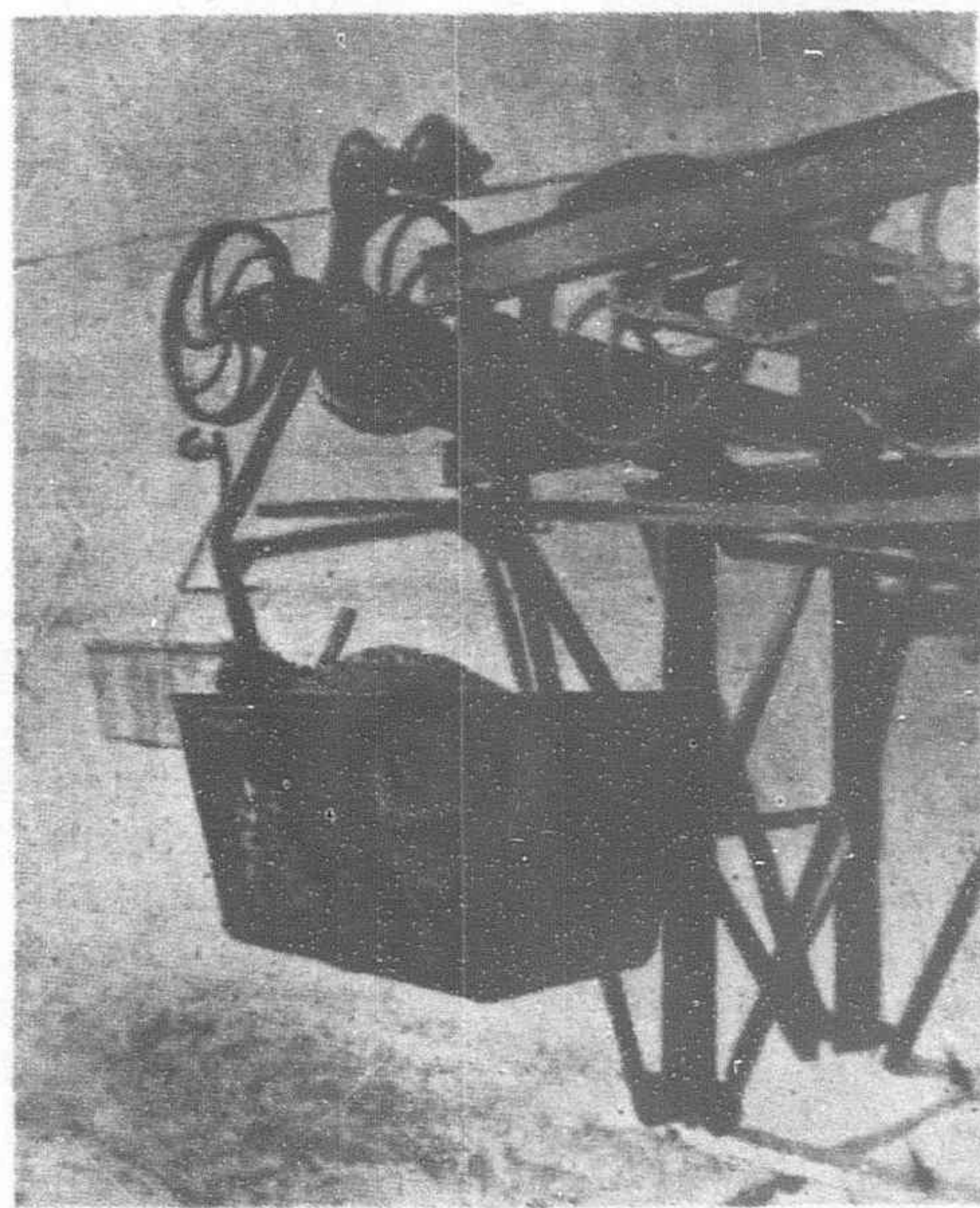


Fig. 8.—A monocable car entering the station to engage the shunt rails. The Tilmanstone ropeway, net pay load 15 cwt. (Ropeways Ltd.)

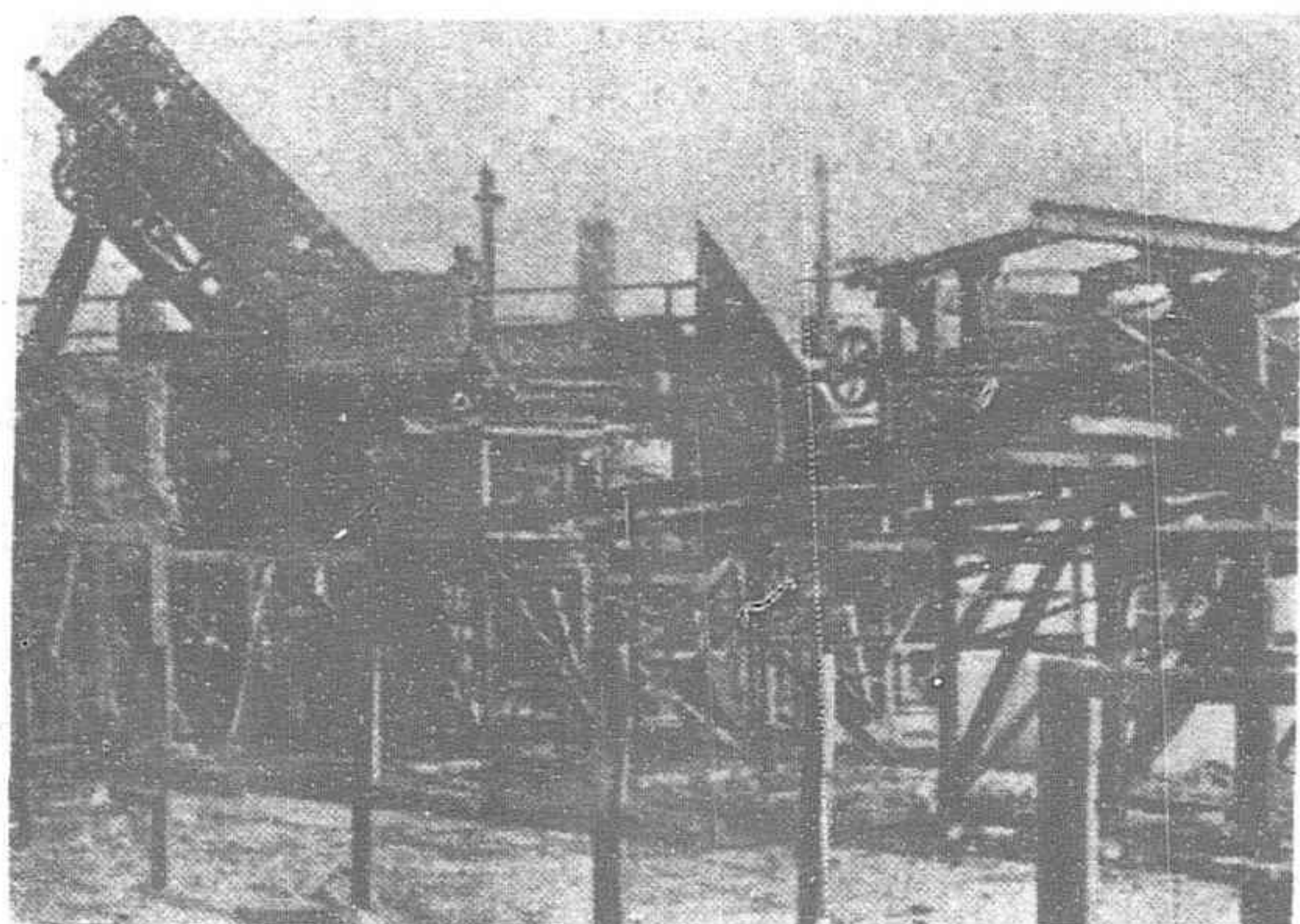


Fig. 9.—A monocable loading station fed by a wagon tippler (Ropeways Ltd.)

tipping frame on which the car wheels run in such a way as to still enable the travelling rope to maintain the car in motion via the rope saddles. A tipping frame of this nature is illustrated in fig. 10.

Such tipping frames are generally fixed structures over hoppers or storage bunkers but a special and elaborate frame which takes the form of a travelling gantry covering a large storage dump is shown in Fig. 11....., such an arrangement enables very full and economic use of the dump area available.

There remains the questions of the choice of Primemover and signal gear but, as these items are common to both types under discussion it is proposed to deal first with the Bicable.

It will not however be out of place to remark that the Monocable Ropeway as will have been seen is simple and efficient where the line is straight from end to end with relatively easy gradients and where the individual loads are not excessively heavy though modern development and design, as practiced by one of the leading British Manufacturers, has produced Monocables having capacities up to 180 tons per hour with correspondingly heavy individual loads, an excellent example of which is to be found in Kent connecting Tilmanstone Colliery with Dover Harbor with which installation the author was directly connected.

The length of this line is just over $7\frac{1}{4}$ miles its normal capacity being 120 tons of coal per hour. To drive a line of this length from either of the terminal stations is unsatisfactory and presents considerable difficulty, the ropeway is therefore divided into what are virtually two sections driven by a common driving gear situated at a Divide station, figs. 4 and 12, some 18,000 feet from the colliery loading terminal, the tension gear for each section being also incorporated in this station.

Here it was originally proposed to put down an H.T. Electric Drive but due to transmission line restrictions a self contained 200 h.p. Steam Plant was installed the engine being a Robey vertical, enclosed, compound, condensing unit running at 400 r.p.m.

A Lancashire boiler fired with coal abstracted from that being transported by the Ropeway supplies steam, a ten strand cotton rope primary drive being employed to drive the double reduction mill gearing, which is common to both sections of the Ropeway, through a Crofts friction clutch.

At this Divide Station the buckets or skips of the Ropeway cars, both full and empty, leave the rope of the one section to run on graded shunt rails and automatically re-engage the rope of the other section.

It will be obvious that to discharge the load from a car when on the open track of a Monocable would result in catapulting the whole car from the rope due to the sudden reduction of its dead weight... it is therefore necessary to provide at the discharge points a rigid track or

At about 14,000 feet from this Divide or driving station in the direction of the Harbor is a semi-automatic angle station which deflects the line through an angle of 44° and after a further 2,500 feet the line enters twin tunnels 1,250 feet long to travel to another 44° angle station

built underground after which it emerges from the cliff face 86 feet above sea level and runs along the 2,500 feet Eastern arm of Dover Harbor to the discharge terminal figs. 10 and 13 on the top of a 6,000 tons Reinforced concrete bunker into which the coal is automatically discharged.

The rope speed at the rated capacity of 120 tons per hour is 390 feet per minute and with cars having a gross weight of one ton giving a net coal or pay load of 15 cwt the car spacing on the line is 126 feet, the time interval between the dispatch of loaded cars from the loading terminal being approximately 21 seconds.

The car boxhead rope saddles fig. 7, are of the "Passive" type two being provided per car the maximum gradient being not more than 1 in $7\frac{1}{2}$.

The 4-in., 6/7 Langs Lay Spiral Construction Steel Wire Rope of 90/100 tons per sq. inch tensile steel, having an actual breaking load of 58 tons, is carried on 177 steel trestles having balanced groups of four sheaves on the loaded side with pairs on the empty or return side. The average height of the trestles is approximately 33 feet though there are some as high as 75 feet while to comply with the requirements of local authorities there are a total of 15 protection bridges one of which passes over the Southern Railway.

In all there are 11 hands employed in the stations with an engine driver, fireman and one maintenance man who is also line foreman, making a total of 15 hands. Operating costs have worked out as follows:—

Labor and power ..	2.15 pence per ton
Maintenance and renewals including way leave charges	2.56 " " "
Total ..	4.71 pence per ton

For a distance of seven miles only, and an output of 120 tons per hour this works out at less than 0.7 pence per ton mile which, on the rail rates ruling at the time the plant was started, showed a saving to the colliery of not less than 1/- per ton.

The Bicable System

The second general type of Ropeway known as the Bicable or Tricable employs two or rather three ropes, two of which are placed one each side stretching from end to end of the line or section, one end of each rope being rigidly anchored to some form of fixed anchorage while the other ends pass over suitable sheaves to live tension weights which maintain a constant and uniform tension in the ropes keeping them up to their work as suspended tracks along which the

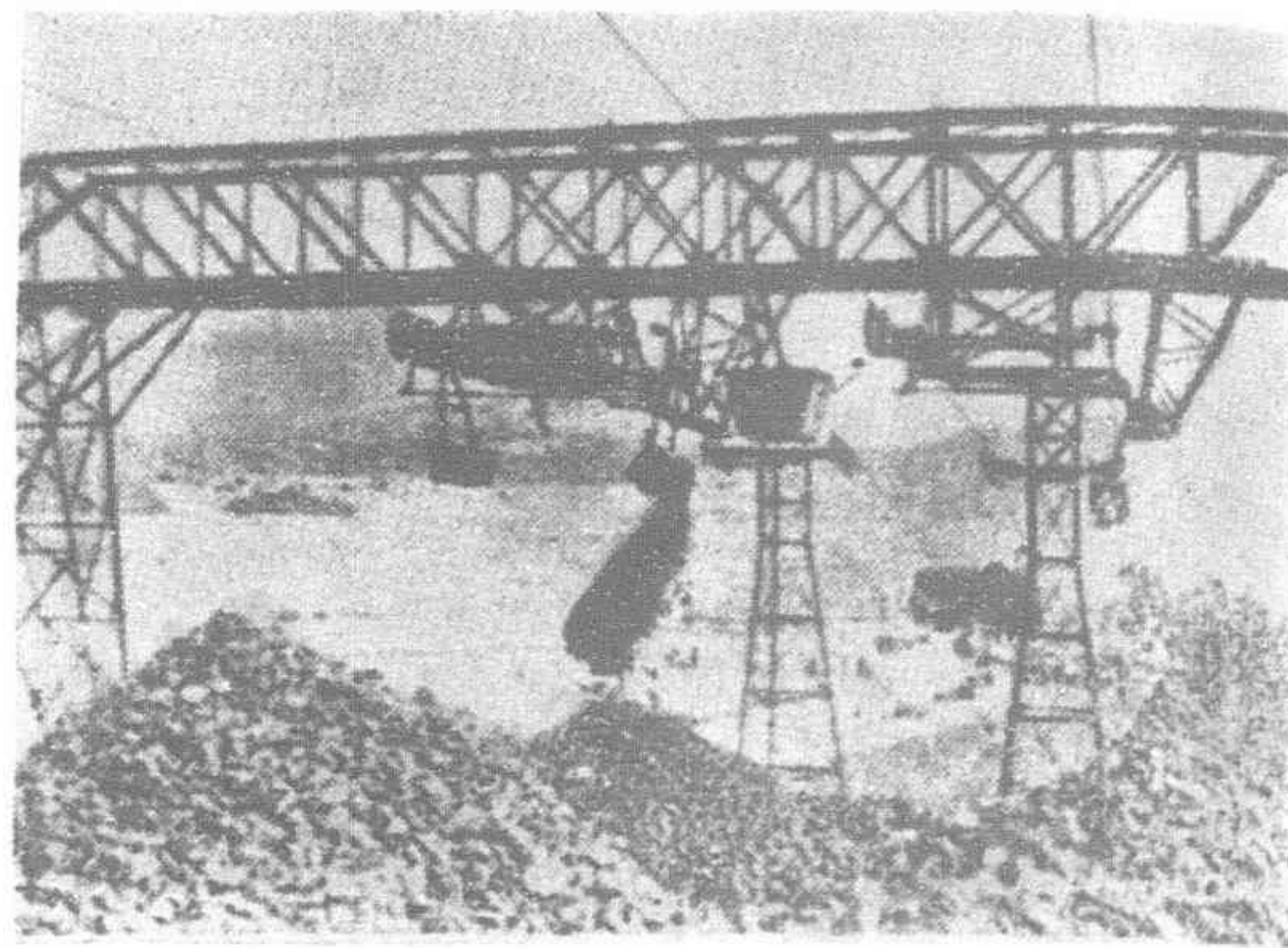


Fig. 11.—A travelling gantry type automatic bucket tripping frame (Ropeways Ltd.)



Fig. 10.—An automatic monocable bucket tipping frame over a 6,000-ton bunker. Ropeway capacity 120 tons/hr. (Ropeways Ltd.)

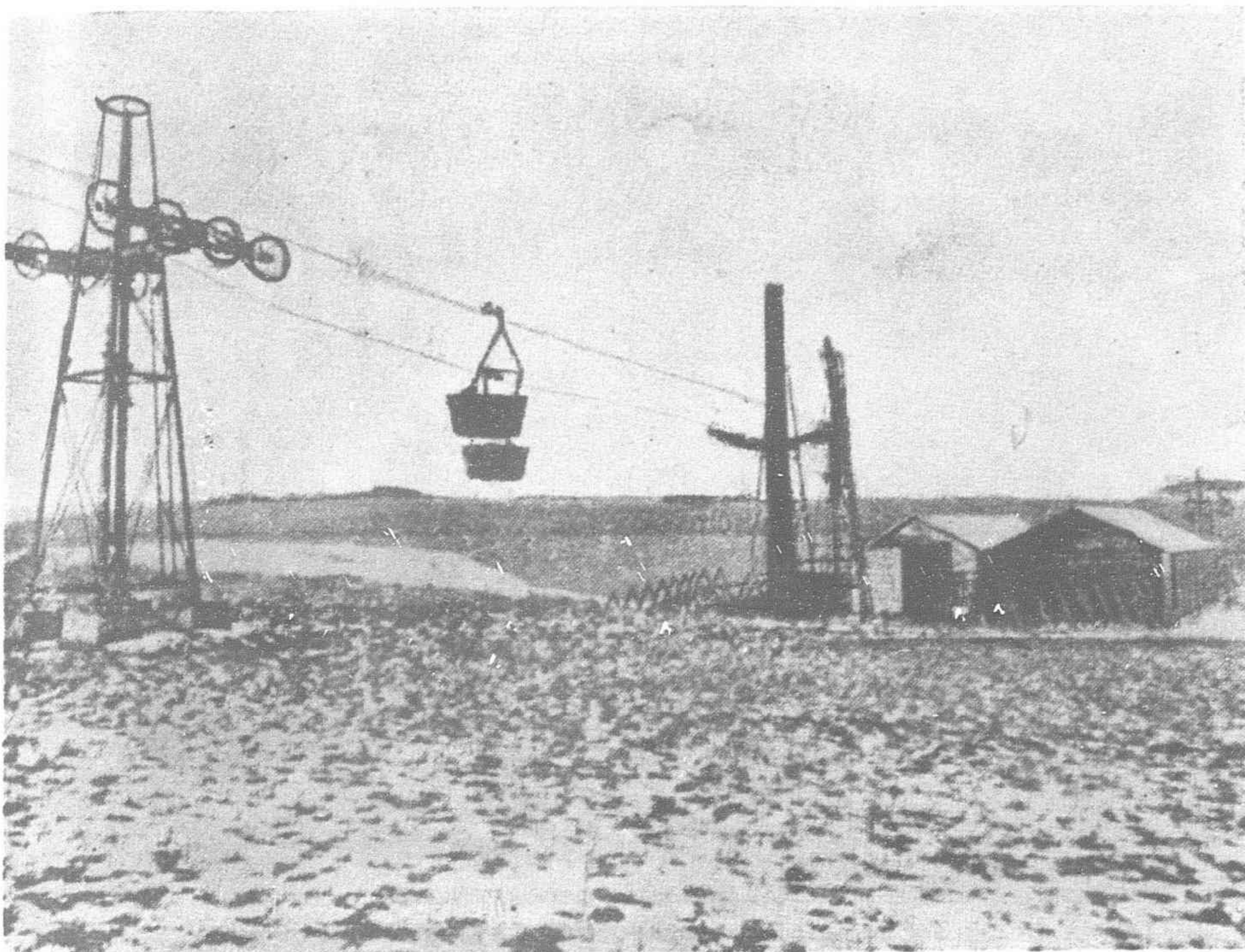


Fig. 12.—View of the line, tension gear and divide driving station of the 120-ton/hour Tilmanstone Monocable (Ropeways Ltd.)

ropeway cars are to travel, irrespective of stretch and temperature variation.

These ropes, which are called carrying, rail, or track ropes, are supported on trestles normally from 450 to 1,200 feet apart though free spans up to $1\frac{1}{2}$ miles are in service, in a similar manner to those of the Monocable except that instead of line sheaves long steel saddles are mounted on which the rope rests. There are two main designs of track rope saddle in common use namely, the fixed and rocking types, the fixed type, as its name implies, is bolted rigidly to the trestle cross trees or channels and provided with grooves of a suitable diameter to take the rope with sliding clearance so that longitudinal movement may take place to allow for stretch and variations of sag due to the passing of the cars.

The rocking saddle is carried centrally on a rigidly mounted trunnion thus rendering it free to take up positions accommodating itself to the contour of the rope as the cars pass along.

One of the earlier types of rocking saddle had in place of the rope groove a battery of small grooved rollers on which the rope rested but owing to the high localization of bearing pressure at the points of contact with the rope severe rope wear occurred with the result that this type has now been almost entirely superseded.

In all cases the saddle grooves are made sufficiently deep so that the running wheels of the cars pass over just clear of the rope thus avoiding unnecessary crushing of the ropes.

An interesting fact however to which reference is made later, is that even if the car running wheels are allowed to bear on the rope at the saddles the principal rope wear does not always take place at these points but at a point some few feet either side of the saddles sometimes referred to as the points of "arrested vibration."

The types of track rope normally employed with modern plant are either of the full or half locked construction though on lines dealing with a small tonnage per hour and where initial cost is of greater importance than efficiency, the cheaper spiral construction rope having no hemp core will answer the purpose in a fairly satisfactory manner. Where the diameter of the rope exceeds $1\frac{1}{2}$ -in. either the half or full locked rope is invariably used, the former having a spiral core round which is a layer of round wires kept apart and locked in position by wires drawn to a special

section while the latter may have two or more layers of wires, all of which are drawn to such sections as to completely interlock with each other, layed over a round wire spiral core.

Authorities differ on the point of preference for one or other of these locked constructions the half locked type presenting a surface not quite as smooth but being lower in first cost than the full locked type which has a perfectly smooth cylindrical surface upon which the car running wheels run with a co-efficient of rolling friction only about three per cent higher than that of a railway wheel on a hard steel rail. In general the locked coil ropes used are made of steel having a breaking stress of from 65/75 tons/sq. in.

It may be mentioned, however, that certain Continental manufacturers have shown a tendency to employ a special spiral construction rope made from high tensile steel wires so that a very high initial tension may be given the rope, rendering the fluctuating bending moment stresses, caused by the rolling loads, of less relative importance.

The advantage of having these track ropes highly tensioned and in consequence as nearly rigid as practicable will be obvious, this being clearly demonstrated near the points of support where the rope is subjected to the heaviest bending stresses, for the slacker the rope the greater the amplitude of bending as a car approaches and leaves these points, such continual bending through relatively large angles having a detrimental effect on the life of the rope.

The older designers of Bicable employed factors of safety of 8-10 in determining the tension to which their track ropes should be subjected with the result that the rate of wear was so high near the points of support that it was not possible to obtain an economic rope life, it being often necessary to renew the whole rope due to this localized wear while the main bulk was still in good serviceable condition.

It is now general practice to use a factor of four to five but factors of as low as $3\frac{1}{2}$ have been employed by one manufacturer using special high tensile spiral construction rope.

Attention has already been drawn to the fact that, irrespective of whether the rope saddle design is such as to allow the passing car running wheels to tend to crush the rope, the maximum wear occurs at places either side of the saddles termed points of "arrested vibration" the generally accepted explanation of this phenomena being that full or half locked construction rope, having no hemp or other soft core, is to all intents and purposes, a solid rod of steel where it rests in the saddle while, in the center of the spans between points of support, it assumes the normal characteristic of a steel wire rope and becomes a flexible member with internal relative movement between the separate wires of which it is composed. Hence, at a point along the rope either side of the supporting saddles, this relative movement between the wires first commences....., this is the so called point of "arrested vibration" and it is here that experience has shown the maximum wear and fatigue to take place.

The hauling or traction rope as its name implies is the means by which the cars are propelled along the suspended track ropes and, in the same way as the Monocable, is looped and spliced endless, passing at one end round a driving sheave and at the other round a tension sheave where the natural stretch is taken up and a constant tension maintained. On each trestle a sheave is mounted on which this rope is carried. Since the only function of this rope is to haul the cars and their loads along the track and not to support them, the sheaves, etc., associated with it are of much lighter construction than the Monocable counterparts. The rope is invariably of the spiral stranded type with a hemp core of 6/7 Langs Lay having a short lay,

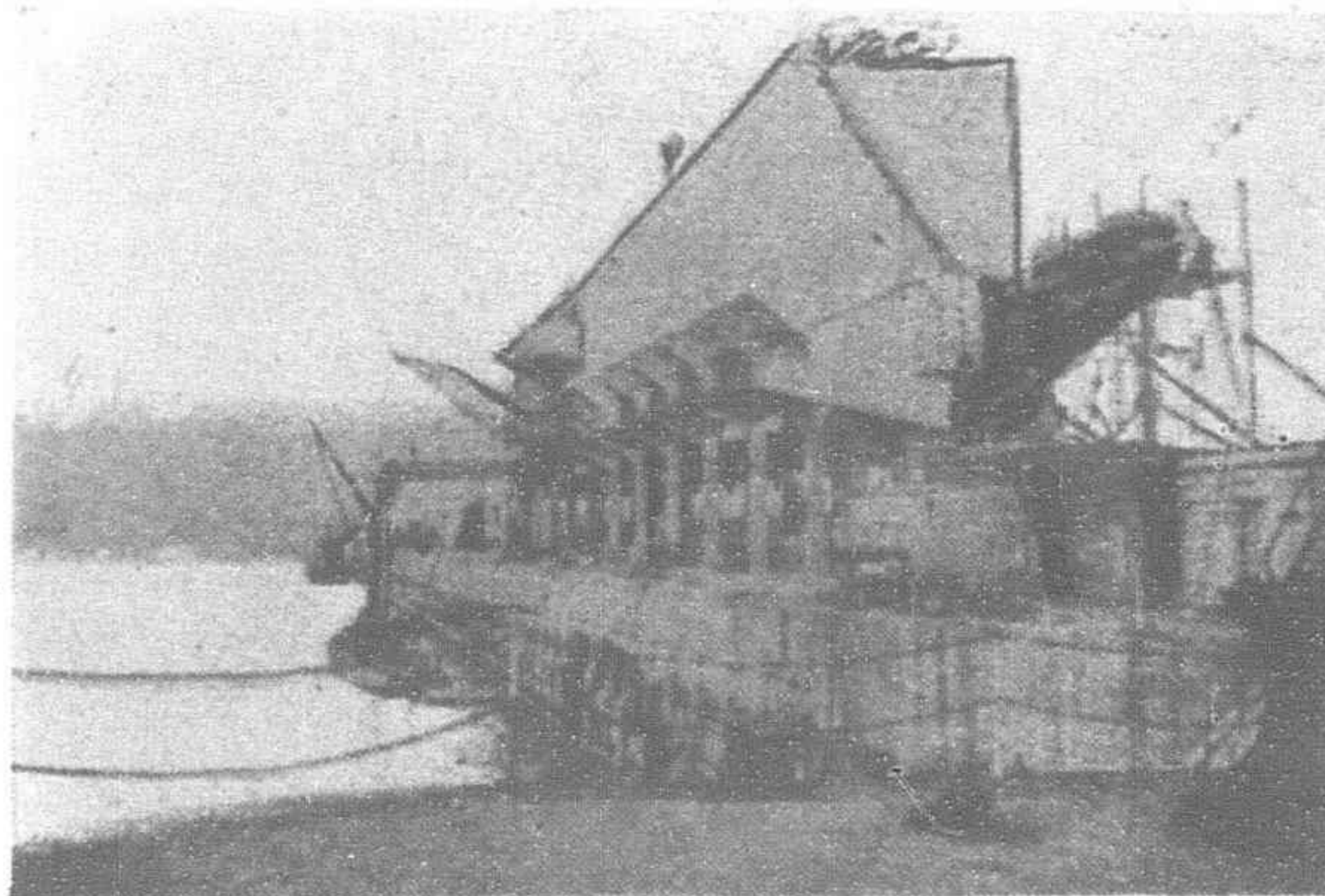


Fig. 13.—The 6,000-ton bunker at Dover Harbor with the discharge and return terminal of the Tilmanstone Monocable erected on top

i.e., the lay of the separate wires of each strand are in the same direction as the strands of the rope itself, so as to give a relatively long exposed length to each wire. A 6/7 construction is incidentally one of the easiest constructions to splice and, as the splices necessary are very long, this is of considerable importance.

In passing it is of interest to note that a relatively new type of rope known as "Tru-Lay" has been used in which the wires are given a performing twist before they are layed up in the strand thus getting over the tendency of broken wires in the Langs Lay construction to un-twist and straighten out..... It is doubtful, however, whether this advantage is not cancelled by the greater stretch to which the "Tru-Lay" rope is subject.

The driving gear for the traction rope is in every way similar to that employed on the Monocable but of much lighter construction, the remarks already made in connection with Monocables as to the advantages and disadvantages of the various types of driving sheaves being equally applicable.

A somewhat unusual and special gear has been developed on the Continent which, where large power has to be transmitted as is the case with long, heavy duty lines having considerable gradient against the load, and where 180° lap of the rope on a sheave of even very large diameter would not provide sufficient adhesion, enables the multi groove sheave to be used without the attendant heavy inter-groove rope stresses being set up.

This drive is known as the Bleichert "Ohnesorge" drive and consists of a composite driving sheave having two grooves and a separate rope transfer sheave. The two driving sheave grooves form what are virtually two separate co-axial sheaves on a common shaft coupled to each other and the prime mover through a differential gear so that the driving effort is distributed equally between the two irrespective of the occurrence of slight rope surge due to the variations in tension on the loaded and empty sides, hence, there are no extra stresses set up in the rope between the first and second driving groove and no heavy surging or uneven motion leading to rope hammer in the traction rope.

Attention has not been specifically drawn to the design and construction of the line trestles, terminal stations, or angle stations for it will be obvious that apart from purely mechanical details these will be very similar to those described for the Monocable.

Perhaps the most interesting part of the Bicable Ropeway lies in the car carriages and rope gripping or coupling devices which serve to connect the cars to the constantly moving traction rope, a large amount of ingenuity having been shown by designers in producing the various types of these couplings which have had, and in certain cases still have, considerable popularity with different manufacturers.

Practically all types of coupler consist primarily of a fixed and movable jaw, the latter being so arranged as to close on the traction rope and maintain sufficient grip to ensure that the cars follow the rope motion without slip, the means by which this movable jaw is operated and the position of the jaws relative to the track ropes being the source of the numerous types produced.

These couplers may be divided into two main types, those employing screw operation, and those with lever grips, there being a further subdivision into over and under-types according to whether the coupler jaws are carried above or below the track ropes.

The earlier type of screw operated coupler had its movable jaw actuated by a spindle with both a quick pitch and fine thread controlled by a weighted lever which, on coming into contact with specially placed strikers in the terminal stations, and thereby being rotated through about $\frac{1}{4}$ of a turn, opened or

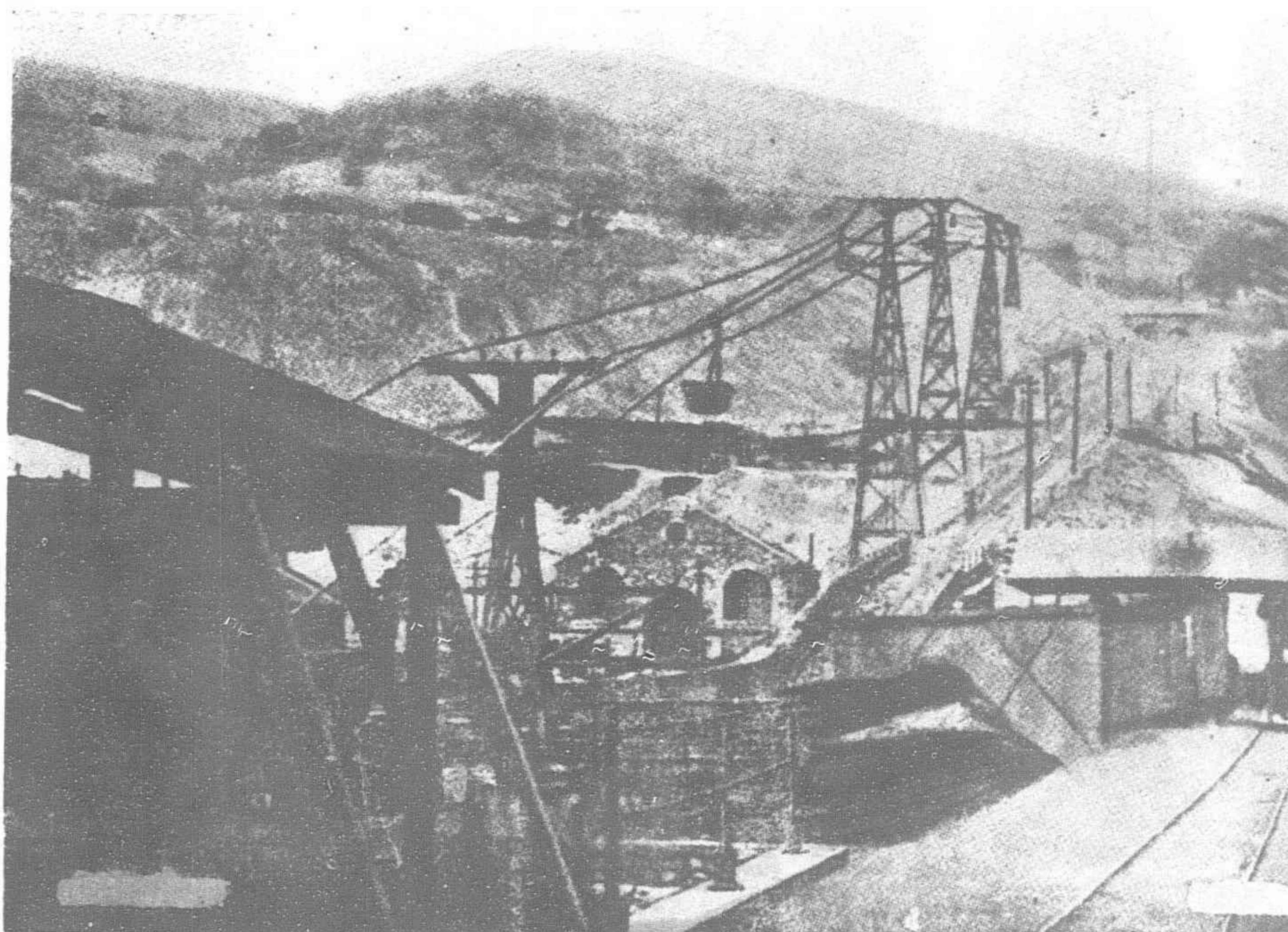


Fig. 14.—A double service bicable transporting 60 tons of coal in one direction and 40 tons of stone in the opposite direction per hour (Bleichert)

closed the coupler as required, the quick pitch thread bringing the moving jaw up to and just gripping the rope, the fine thread screw then coming into action and applying the necessary force to make the coupling firm.

A later modification of this screw coupler was to effect its operation by the weight of the carrier and load itself, rollers being arranged on the hanger in such a manner that on engaging angle rail cams in the terminals, the whole hanger and load carrier is raised relative to the carriage, thereby actuating the coupler jaws.

While this type of coupler is reasonably effective it has now been generally replaced by one or other of the gravity lever operated designs in which the weight of the hanger and load receptacle, empty or full, actuates the coupler through toggle or other simple lever arrangements, the intensity of grip exerted on the traction rope being directly proportional to the dead weight to be moved, a ratio which is obviously the most efficient.

The general arrangement of such a coupler is shown in fig. 19 the method of operation being as follows:—

The car being loaded it is pushed to the rope coupling point where the rollers *f*, ride up on to a double angle cam rail *b*, thereby raising the pin *e*, and, through the actuating rod *c*, the hanger *d*, with the load is likewise raised. The outer movable jaw, being coupled to the actuating rod, thereupon opens outward and allows the traction rope to drop between the jaws.

As the car is moved along the shunt rail, the cam rollers run down the sloping cam rail *b*, allowing the weight of the hanger and load to close the jaws on the rope.

This cycle of operations is repeated in the reverse sequence at the terminal uncoupling points.

Both the screw and lever type couplers can be made for either the over or under running traction rope, the former having the traction rope carried above the track ropes, while the latter has it below these ropes. The most important advantages of the overtype are that the terminal stations may be made shorter due to it being possible to lead the traction rope in and out of the coupler jaws without regard to the shunt rails, the taking of angle stations and return terminals in both directions is rendered somewhat easier and, with the lever operated coupler, the overtype is cheaper in first cost.

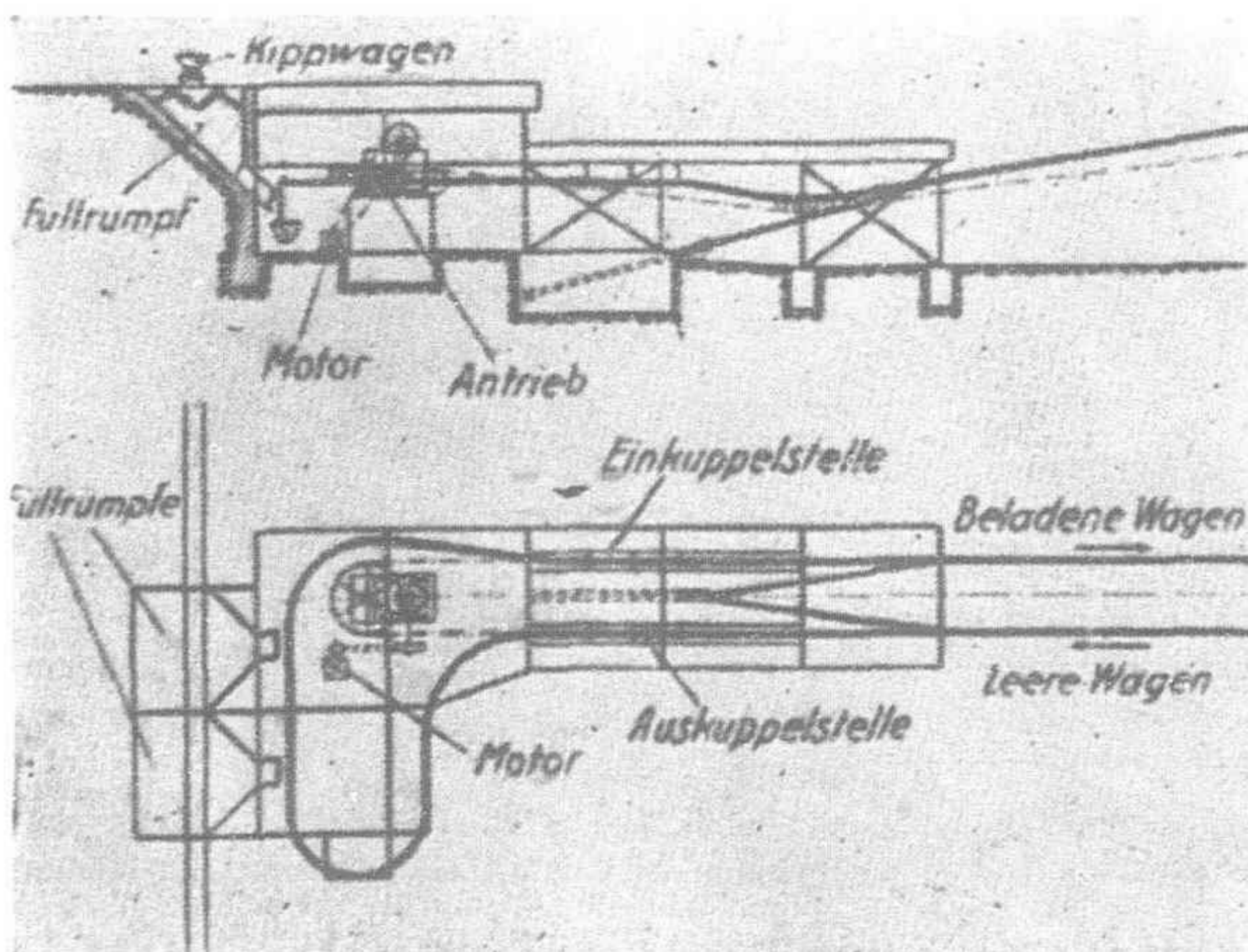


Fig. 15.—A diagrammatic arrangement bicable loading and driving station

There are, however, several over-type disadvantages which, in general, more than outweigh the above advantages and have led to the practically universal adoption of the under-type for all normal plant. One of these disadvantages is that when ascending steep gradients the reaction of the traction rope tends to tip the carriage and does, under certain conditions, cause the whole car to leave the line while, due to the fact that center line of the traction rope falls outside that of the track rope, there is a tendency to swing the carriage sideways, an effect which is particularly detrimental to the efficient working of automatic dumping Ropeways.

These disadvantages are not apparent with the undertype coupler where the traction rope is immediately below the track rope and, if the coupler is arranged with the jaws opening downward, the disadvantage of the extra length of terminals required with the increased steel structural work involved, may be minimized.

Difficulties have, from time to time, been experienced with the gravity lever coupling due to slight rope hammer at angle stations causing disengagement....., some makers, notably Messrs. White of Widness, having introduced forms of retaining plates which lock the coupler while the car is on the line between terminals, but, with well designed

plant, the incidence of severe rope hammer is so small as to render this precaution normally unnecessary.

All modern couplers are designed to enable return terminals and angle stations to be negotiated absolutely automatically without attendance and without detaching the coupler and car from the traction rope, while it is possible to dump the individual

loads absolutely automatically at any point in the stations or on the open track.

This automatic tipping of the buckets on the line may be done without the necessity of special tipping frame rails as are required with the Monocable, the arrangement commonly adopted being to carry the buckets or other load receptacle by trunnions set well below their center of gravity and fitting a

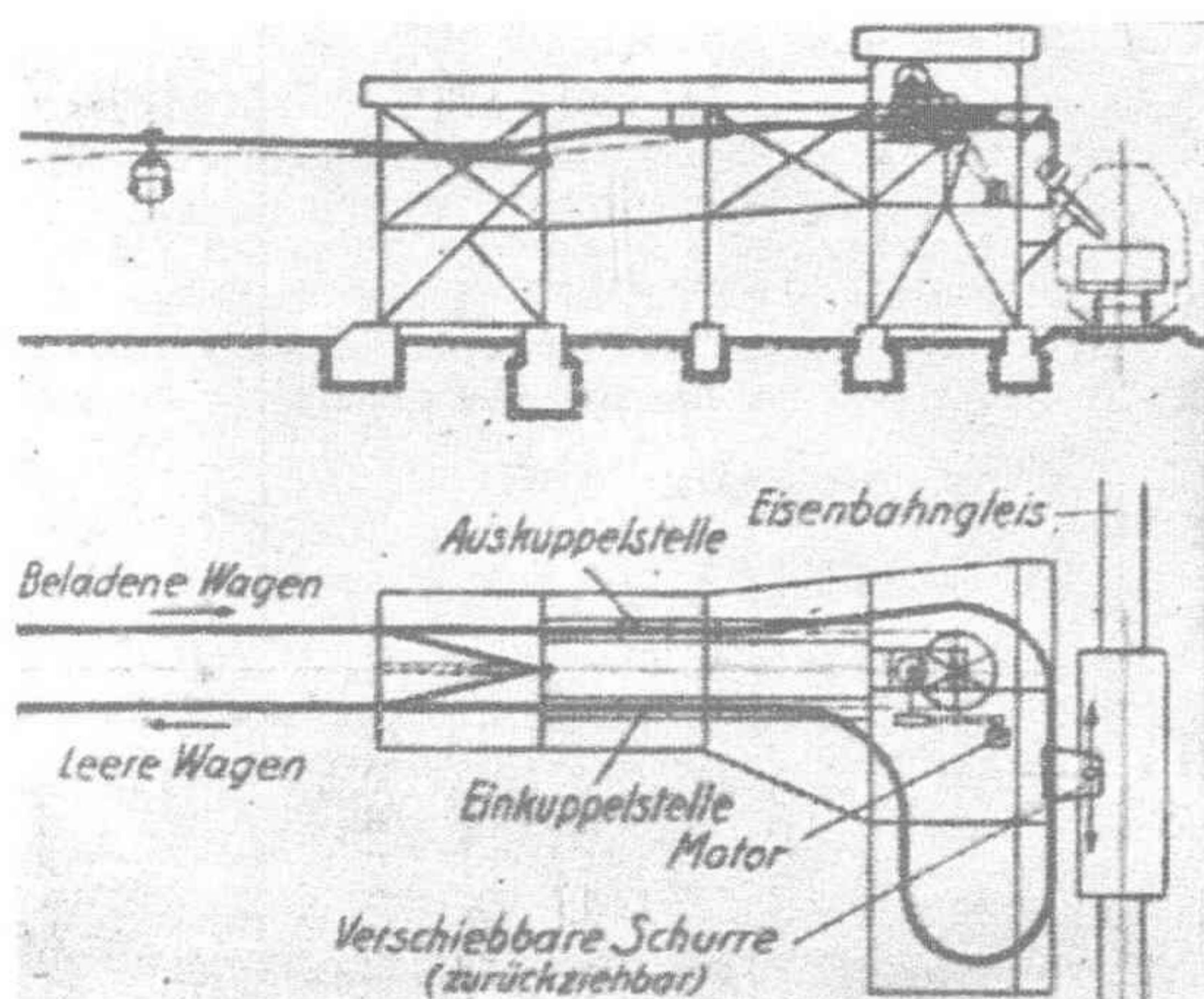


Fig. 16.—Diagrammatic arrangement bicable discharge and driving station

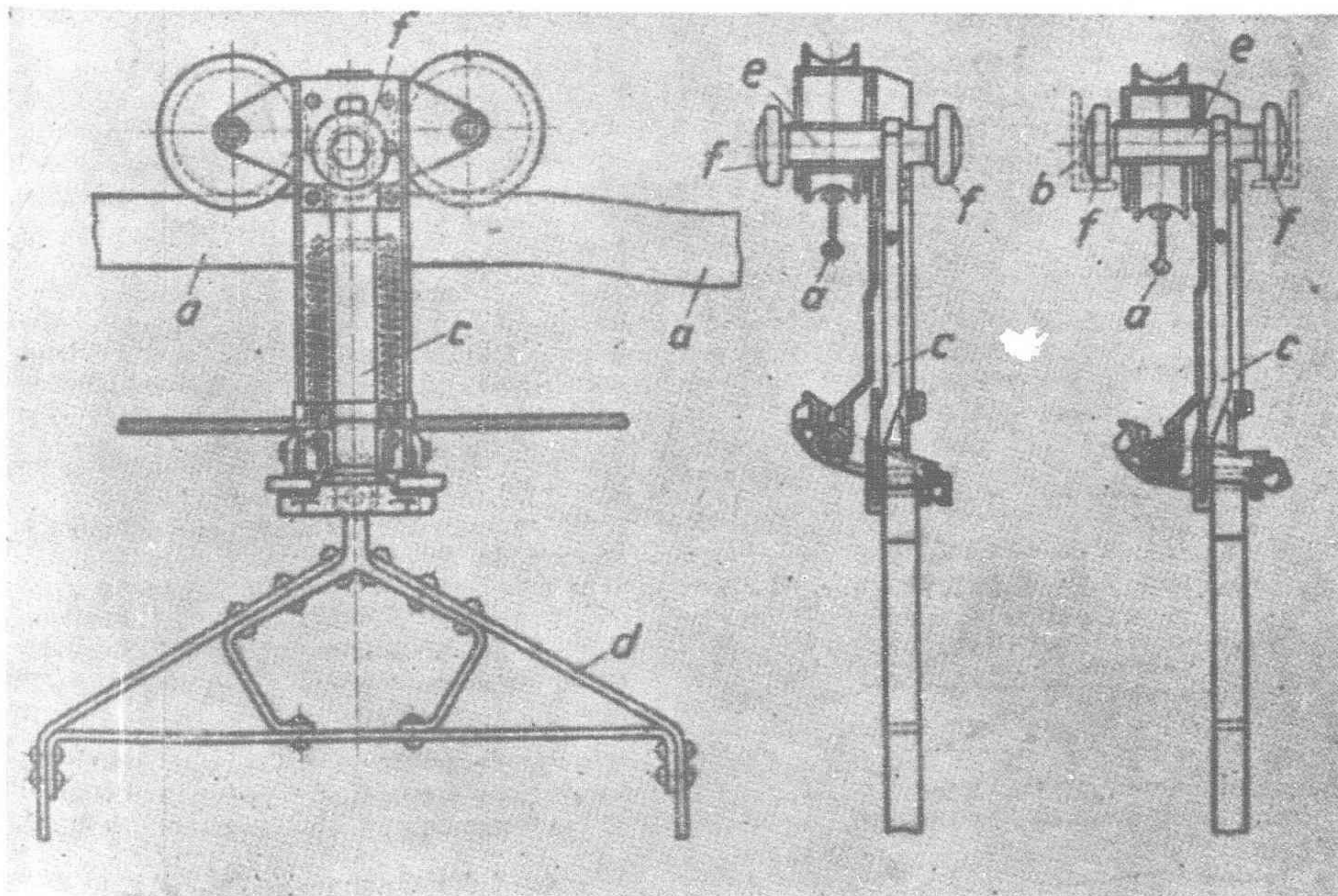


Fig. 19.—A typical bicable undertype coupler and car. The Bleichert "Automat."

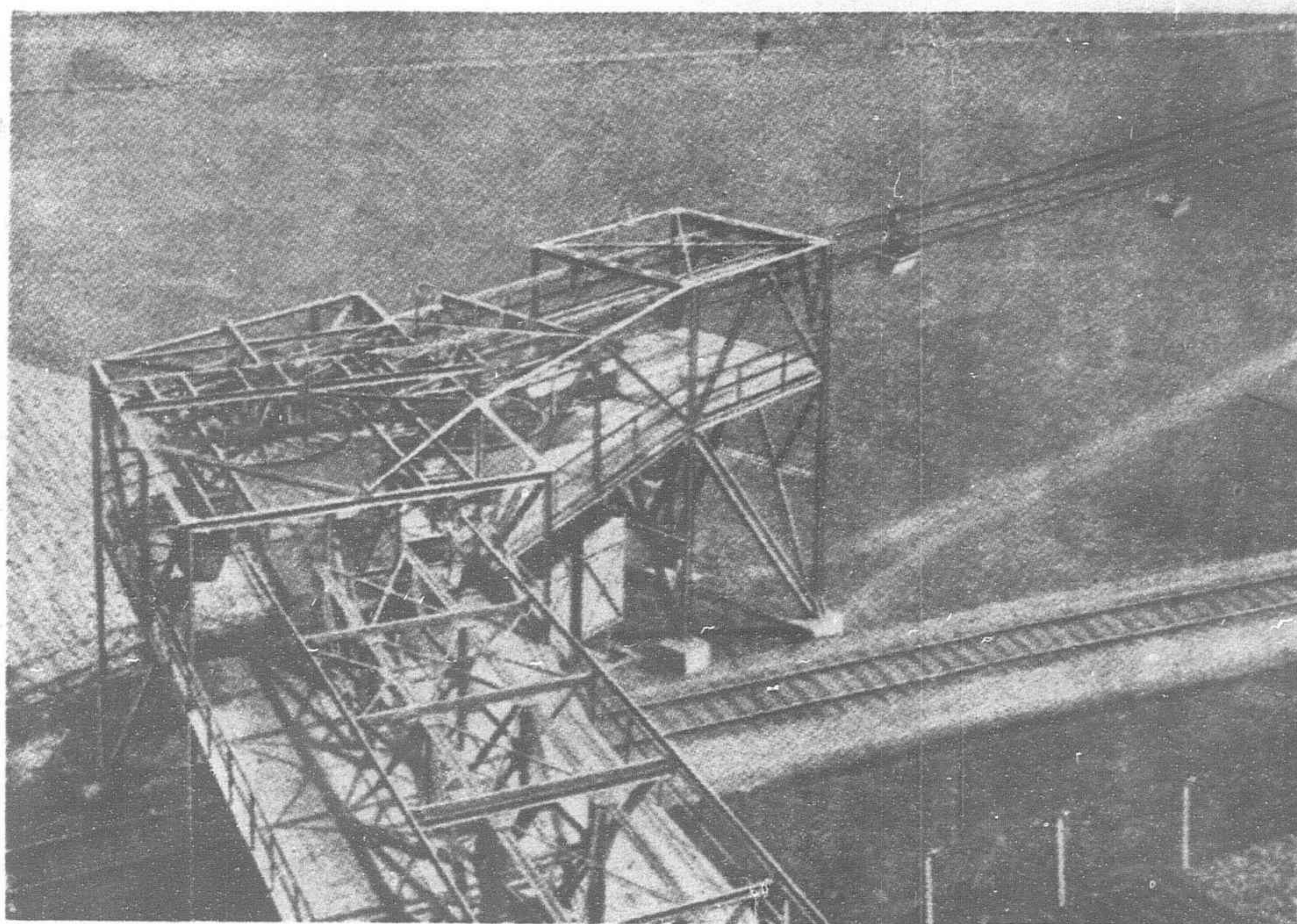


Fig. 17.—Automatic bicable angle station line. Line capacity 140 tons/hour. (Bleichert)

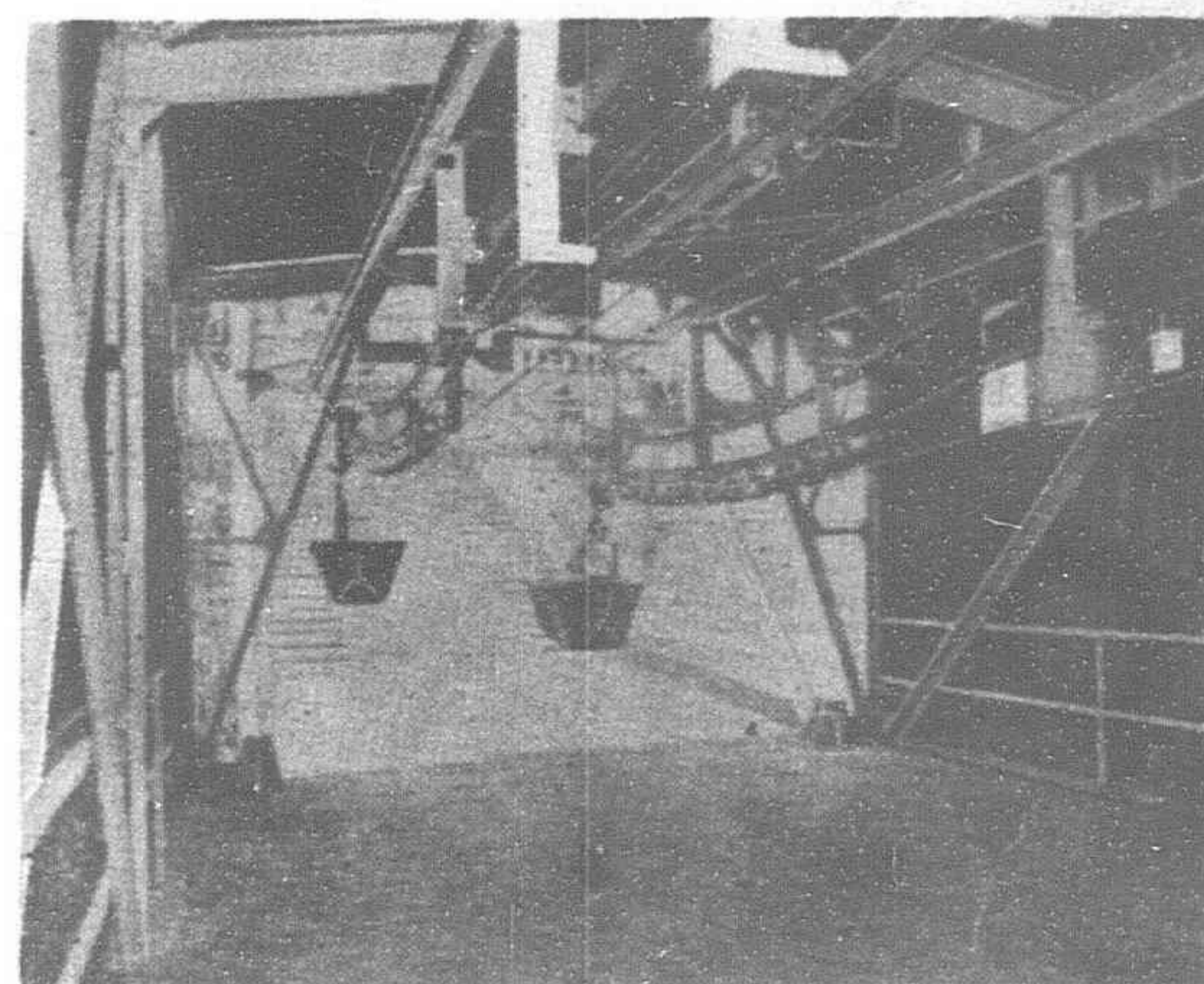


Fig. 18.—A bicable terminal exit showing traction rope roller batteries (Bleichert)

catch lever in such a manner as to engage with a slotted plate fixed to one of the hanger arms thereby securing the bucket in an upright position.

This lever, which is usually of bell crank form, is made in various ways to strike with its upper arm a detent or trigger at the point at which load discharge is required and, in doing so it is knocked over thus releasing the bucket and allowing it to capsize about its trunnions, the car subsequently continuing its journey with the bucket inverted. Such automatic discharge on the line is shown in operation on fig. 20.

In some cases, where special clearances have to be observed or where cross windage is of great importance, it is necessary to right the buckets before they continue their way back to the loading terminal—, this may be, and is normally done manually at the return terminal, but latterly several devices have been brought out, notably by White of Widness, to upright the buckets mechanically as they travel through the terminal without manual assistance.

(To be continued next month)

Engineering Notes

RAILWAYS

RAIL LINE OPENS:—The newly constructed railway connecting Sinsiang on the Peiping-Hankow line and Kaifeng on the Lunghai line was opened to the general public in June under the management of the North China Communications Company. Reports from Taiyuan, capital of Shansi Province, say that the new post offices at Linfen and Yuncheng on the Tatung-Puchow line have begun handling foreign telegrams, indicating a return of peace and order to southern Shansi.

TOKYO STATION CONGESTION:—Tokyo Central Station, which was considered too large when opened in 1914, is now suffering badly from congestion. About 30,000 passengers use it hourly in the rush hours, while over 350,000 are handled daily on an average. Plans for enlargement are held up owing to lack of necessary materials, due to the hostilities in China. The Railway Ministry is now offering prizes to officials and employees who send in good suggestions to relieve the situation.

NEW RAILWAY:—Close upon heels of the scheme to build a 123 mile submarine tunnel under the Chosen Strait, the Railway Office has announced the intention of embarking on the construction of a standard gauge trans-Tokaido and San-yo rapid transit line between Tokyo and Shimonoseki, parallel with the existing Tokaido and San-yo trunk lines. To that end the Railway Office has set aside ¥200,000 as a fund for a technical survey to be commenced in the 1939-40 fiscal year.

COMMUNICATIONS

WIRELESS TELEPHONE.—Wireless telephone service between Chungking and Manila, contracted for recently between the Hongkong Government and the Cable and Wireless Company, will be at the service of the public by the middle of August.

NEW TOKYO AIRPORT.—Work on the new ¥10,000,000 airport for the city of Tokyo off Susaki, Fukagawa Ward, was begun August 1, with a Shinto ceremony, reports the *Hochi*. Mayor Tanomogi and other high officials of the municipality and the prefecture took part in the function, with over 150 dignitaries attending the ceremony.

YANGTZE SHIPPING.—One new Japanese river steamship will be placed in early July on the Yangtze river run between Shanghai and Hankow, and seven similar vessels are reported under construction in Japan. The Japanese authorities have also issued permits to a Portuguese vessel to make weekly sailings between Canton and Macao, carrying goods and passengers.

KOFER GETS ORDER.—The Kofler Train Control Co., Ltd., has received an order from the Bulgarian State Railways Administration for the installation of the Kofler train control apparatus on the Sofia-Mezdra main line with equipment for 15 stations and four locomotives. An English company has now been formed and arrangements made with Tyer & Co., Ltd., for the manufacture of Kofler train control apparatus.

RESUMES RAIL SERVICE.—Provisional freight and passenger train service was resumed early on the lower section of the Canton-Kowloon Railway up to Shektan station. At the same time, temporary service was also resumed on the Canton-Samshui railway.

These railway services are managed by the Japanese military and passenger fares and freight rates are being charged in Japanese currency. The remainder of the Canton-Kowloon Railway cannot yet be operated because the repairs of the bridges as well as of the track are not yet completed.

NEW CHINA HIGHWAY.—Construction of a highway between Loshan in the western part of Szechuen Province to Sichang in the southwest, was begun as a link in the projected Loshan to Yunnan highway, to a dispatch from Chengtu.

The establishment of the route to Yunnan Province is under the joint planning of the Chinese military headquarters at Sichang and the Sikiang Provincial Government, and construction work on the Loshan-Sichang sector is being supervised by Mr. Lo Mei-lun, head of the communications department according to the Sikiang government.

CHINESE RAILWAYS.—Work on the new railway line linking Kwangsi Province with French Indo-China is progressing smoothly, according to information from Chungking.

It is reported that the Kweiling-Liuchow section within Kwangsi Province will be opened by the end of August, while rails will be laid down shortly on the Luichow-Nanning link. The section between Nanning and Chen-nankwan on the French Indo-China border is expected to be opened for traffic by the end of this year. The new line will form an additional route for supplies into the Southwestern Provinces.

CANAL IN CHINA.—Plans are now being made under the supervision of Japanese authorities for a canal between Tientsin and Shihkiachwan, Hopeh Province, according to Domei.

The projected canal will be about 200 miles in length, 10 feet in depth and 20 feet in width. It is expected that this new waterway will cost about ¥100,000.

CHINA GIVES FRANCHISE.—Chinese authorities are reported by the press to have given exclusive franchise to a French enterprise for the operation of motor trucks on the Kunming-Luchow-Chungking Highway, according to a radiogram from the Office of the American Commercial Attaché, Shanghai, dated June 10. It is announced that 500 French trucks are to be placed in operation, the trucks to be paid for by Chinese authorities within three years. Entire traffic is to be under Chinese control.

SHIPPING

JAPAN'S SHIPPING PLANS:—A shipbuilding program announced by the Japanese Ministry of Communications states that the country's merchant fleet will be 7,500,000 tons by 1942. At the end of last year Japan had 1,169 merchant ships of over 1,000 tons. The fleet tonnage aggregated 4,941,000.

NEW O.S.K. SHIPS:—Plans have been completed by the Osaka Shosen Kaisha for the construction by the Kawasaki Ship Building Company of four 8,000-ton passenger and cargo vessels to be placed on the Japan-Dairen run. The four ships are scheduled to be completed early in 1941. The O.S.K. followed the example of several other Japanese shipping lines which have been expanding their services to relieve the heavy traffic congestion between this country and the continent.

NEW D.K.K. SHIPS:—Fourteen new steamers with a total tonnage of approximately 70,000 tons will be built by the Dairen Kisen Kaisha (D.K.K.) by 1941, it was announced by the company's main office. The vessels will range in size from about 2,000 to 9,000 tons each, and will be employed in coastal traffic with Japan and China, with Dairen as the operating center. The new vessels are needed partly for replacing some of the company's older, slower ships, and also for meeting the expanding oversea traffic.

INDUSTRIAL

FERTILIZER CONCERN.—The Japan Phosphate Rock Company, national policy concern for the control of imports and distribution of one of Japan's most important fertilizer materials, opened for business on August 1, reports the *Nikkan Kogyo*. All future imports will come under control of the Company.

TRANSFER PLANTS.—The transfer from Japan to Manchuria of 30 engineering plants has been decided by the Tokyo Ministry of Commerce and Industry. This transfer will be limited to small and medium-sized machine shops, machine-part factories, and automobile repair plants, Tokyo papers report. Seven of the 30 plants in question at present are located in Osaka.

NEW POWER PLANT.—It is reported that the Japan-Inner Mongolia Electric Industrial Co. will begin construction in July of a 4,000-kilowatt power plant at Kowkuanchen, south-west of Tatung in Shansi Province, at a cost of ¥60,000,000. Plans call for completion of the plant early next year, while reports state that another ¥7,000,000 power plant is also to be built at Shuiho, near Tatung.

ANGLO-CHINESE TRADE.—A National Government trading commission has been set up in London, according to Chinese newspapers, for the purpose of selling Chinese produce in the United Kingdom and buying British goods in return. Several prominent British and Chinese Government officials and bankers are connected with this new commission, it is stated, including the Chinese Ambassador and a director of the Bank of England.

HITS AT NYLON.—The International Silk Guild, the publicity organization for raw silk and silk textiles, has decided to establish a silk house in New York, which will be the headquarters for an active propaganda campaign against Nylon and for silk, says the *Nichi Nichi*, which explains that the guild has already purchased a \$200,000 five-story building in the business center of New York for this purpose.

NEW HOTEL.—Construction of a seven-story, 2,000-room hotel on Matsui Boulevard, connecting Dixwell Road to the Civic Center, in Shanghai, is being envisaged by a Japanese bank consortium, the *Shanghai Mainichi* reported.

The hostelry would cover an area of 2,800 square-meters of land and contain rooms in Japanese, Chinese and Western styles besides an amusement hall, an auditorium, and a gymnasium, according to the newspaper.